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- Crystal Selection for the FT? Newcomers Notebook The LM3900 Phase Locked L The Smaller The Better Try This Tune to 40 Metres, My Way 50 Hertz Null Filter

GENERAL -

The G6CJ Aerial Circus VK-ZL Contest Results for 1975 WICEN

DEPARTMENTS

COVER PHOTO

Warrant Officer Bernie Simmonds operating the Collins mobile communications centre on 21 MHz. This munications centre on 21 MHZ. Inis equipment is fully automated, self-tuning on all frequencies and was displayed at the Royal Australian Corps of Signals Golden Jubilee celebrations last November.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA



RADIO SUPPLIERS 323 ELIZABETH STREET, MELBOURNE, VIC., 3000

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Suitable for Novice Amateurs 5 W, AM 23 Channel 12V DC

operation. S-meter, squetch, ant. & PA facility.

\$115 P&P \$3

AMATEUR TRANSCEIVERS

YAESU FT101E 160-10m SSB, AM and CW Transcelver with RF speech processor littled Transceiver with RF speech processor littled 240V AC and 12V DC PSU inbuilt. \$576 KENWOOD TR7200Q 2 metre FM Trans-ceiver, 10 wall and 1 wall operation fitted with crystals for operation on 146.1 and 146.4 receater channels 12V DC. \$218 KENWOOD TR2208G handy 1 wait, 12 channel transceiver for 2 metres FM. Fitted with 4 sets repealer crystals. Inbulit ni-cad

ICOM IC202 2 metre SSB Transcelver, 3W PEP, SSB operation. Provision for external antena, DC input etc. \$186

MULTI 7 2 mairs FM Transceiver Sted with 7 repeater, 7 anti-repeater and 3 simplex channels, 10 walt and 1 watt output. 12V DC operation. \$239 KEN KP202 stubby helical antennas. 18.50

27 MHz (11 METRE) EQUIPMENT

LAFAYETTE HAS10 Walkie 3 channel fitted with 27.240 crystals. PMG approved. \$135 pair LAFAYETTE MICRO 66 5 watt transceiver, 6 channel operation, litted with one set

LAFAYETTE 27 MHz fibreglass cowl mount mobile loaded antenns, 36" long, complete with base and coax. \$23.95 LAFAYETTE 27 MHz combination AM Radio and 27 MHz loaded antenna complete with splitter harness, cables and plugs. \$28.95

LAFAYETTE 27 MHz gutter mount mobile antenna complete with coax cable and PL259 plug. \$22.50 14 WAVE STAINLESS STEEL 27 MHz mobile

entenna with heavy duty spring, base and 6 CHANNEL 5 well AM 27 MHz mobile transceiver, PMG approved for 27-880 MHz operation with crystals for 27-880. \$101.60

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Bridge Road, Richmond during the next twelve months we have decided to temporarily move our operations at 190 Bridge Road, to our Bulk Store at 194 Highest Street, Richmond. As previously advertised we are desperately short of space and with the re-location of our business, the need has become even more unpeut An Auction Sale of new and seek phonoments and the phonoments are phonoments are phonoments and a phonoments are phonoments. The phonoments are phonoments are phonoments are phonoments are phonoments are phonoments. The phonoments are phonoments are proposed for the near future and will be baid at 250 bridge flood, filed be baid at 250 bridge flood, filed be baid at 250 bridge flood, filed to call at only large phonoments.

You are again invited to call at our Bulk Store and Inspect the large range of equipment which must be cleared. He reasonable offers will be released. stalogues are now being prepare or the Auction and should be avail bet soon from any of our three pre set locations.

MODEL NC-310 DE LUXE 1 WATT 3 CHANNEL

TRANSCEIVER WITH CALL SYSTEM

CONNECTION SPECIFICATIONS:

Translatora: 13 Transmitter Frequency Tolerance: ±0.005% RF Input Power: 1 watt Tone Call Frequency: 2000 Ha

Tone Cell Frequency: 2000 Hz
Receiver type: Superheterodyne
Receiver Sensitivity: 0.7 eV at 10 dB S/N
Selectivity: 45 dB at + 10 bHz
Frequency: 455 bHz
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\$49.50 each or \$95 a pair Post & Pack \$1.50 per unit

11 METRE (27 MHz) CRYSTALS We have Walkle-Talkie Crystals for the fol-27.065

27.155 27,255 \$6.50 A PAIR (Transmit and Receive)

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We have purchased a quantity of crystals to suit the KEN KP202 Transceiver and offer them at a special reduced price while they last. Transmit Crystals Receiver Crystals

\$3.50 EACH



BRIDGE ROAD, RICHMOND STORE SPECIALS DIODES 1 emp. 1 kV Mini Diodes. Type A14P.

10 for \$1,80 - PAP 30c. FLEXIBLE PLASTIC "CHOCOLATE BLOCK" 1. cm x 4 cm, 12 connectors, terminal strips. 10 for 34 — P&P 75c.

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s n. 3 CORE AC LEADS with moulded 3 pin plug. 10 for \$6.50 - PAP \$1.50. NEON FLASH TUBES (ex Repco). Ideal for Ignition timing lights. \$1.50 sach — P&P 500 ELECTROLYTIC CAPACITORS 50 assorted popular

values \$5 - PAP 50c RESISTORS 100 assorted 1/2 watt carbon realators, all popular values. \$2 — P&P 50c

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XENON FLASH TUBES suitable for Strobe use. (Sorry, no frigger transformers), \$1.50 ea. P&P 50c.

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Normally 38c ea. 10 for \$2.50 PAP 30c BUSDER Normally 32c eq. 10 for \$2.00 PAP 30c

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Page 2 Amateur Radio August 1976

radio

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amateur QSP UNITY IS STRENGTH It is a fact that the Trade Union Movement has got where it is through the principles

of unity and numerical strength. Ameteur radio societies need to emulate these principles.

Because the testing time for amaleur radio is going to be WARC 79 and the years

All the officers of the IARU are convinced of this. All the officers of the ARRL are alart to the danger signs. All the officers of the RSGB, WIA and other societies find the evidence irredutable.

Regrettably this is a deadly serious matter. It is not rumour or conjecture, What can "Mr. Average Amateur" do about it?

Firstly he can help build up the numerical strength of his amateur society — the WIA — by going out of his way to recruit new members and help to keep them.

Secondly he should do everything he can to encourage his fellow amateurs to comply with the spirit of amateur radio.

Thirdly he can do his bit by using the amateur bands — as many bands as he can, as often as he can. And moreover explore and use the higher UHF/SHF/Microwave

As might be expected, higher membership brings other benefits such as more people to share the costs, more ideas coming into the system and hopefully more members to help where help is needed, I commend most strongly your full support for our recruiting drive and help in the other areas listed above. Suitable recruiting brochures are now available, backed up by an advertising campaign. D. A. WARDLAW VKSADW, Federal President,

OSP

From Radio Communication, March '76 It is learnt that UK Ameteurs are now permitted to conduct fascimite transmissions on 3.5-3.8, 7-7.1, 14-14.35, 21,21.45 28,29.7 and 144-148 MHz. the licence forms emissions A4 and F4 with a bend width not preater than 6 kHz will be included. This does away with individual special applications. AUSTRALIAN STANDARD 3159-1976

This was first published as ASC 159 in 1959, revised as AS 3159 of 1972, and is now issued as a re-vised AS 3159-1976. It refers to equipment pro-duced and used for household, office or entertainment purposes and sitellar general use operating at augoly voltages not exceeding 250 V single phase. The standard covers a very wide range of Items (Including single units or modules as well as equipment designed for connection to extra-low voltage or batteries having circuits which operate above extra-low voltage) and includes tape corders, record players, radios. TVs, power suc plies, etc., but is not intended to restrict the use or performance of transmission equipment. The specification is to be read in conjunction with Part 1 of the SAA Wiring Rules and AS C100 and also refers to AS C145 Radio Interference Suppression Devices, AS 1044 Limits of Electromagnetic Interference for Electrical Appliances and Equipment, and AS 1053 Radio Interelevence Limits and rements for Television and Radio Receivars. AS 3159 is entitled "Approval and Test Specification for Flectronic Sound and Vision Equipment". RADIO COMMUNICATION EXHIBITION - LONDON A circular from the RSGB advises that their Radio Communication Exhibition will be held this year from 30th July to 1st August at Alexandra Palace. This is in the Muswell Hill area of Nth. London. An international night for overseas visitors is to be held on Friday evening 30th July. Anyone in the UK at that time should not miss this exhibition of amateur and other near JOTA 1978

Do make a note that time moves on. The 19th Jamboren on the Air will be 16th and 17th October

1975. Suggested starting time is 60.01 h local time on Saturday the 18th and ends at 23.59 h local time on Sunday. This is Scout Communications Thus the Scouts will need greater help than World Scout frequencies are useful for call-Ing CQ Jamboree when free. They are 7990, 14290, 21360 and 28990 kHz for phone, 3390, 7030, 14070, 21140 and 28190 kHz for CW. If you want more JOTA details why not Join in the Australian Scoul Radio net, first Sunday of each month from 9.35 to 11.00 h EAST around 7070 kHz or mear 14290 kHz from 11.00 to 13.00 h EAST same day.

"The latest member of the International Telecommunication Union is the Republic of Guinea-Blessu. The ITU now has 146 members. In accordance with United Nations principles the latest ITU member will have one vote at conferences, as do all nations

who take part". Redio Communication May '76. According to Radio Communication May '76 the ITU provisionally allocated the callsign series

DSA-DSZ to the State of the Comoros. OSP Here is a listing of some less well-known HF standard time and frequency transmissions. They may be a useful bend coming indicator.

Station CHU in Ottawa runs 5 kW on a con-tinuous basis on 3.33, 7.335, 14.870 MHz. The following USA Armed Services stations may also be useful.

All frequencies are in MHz

NPG, 12.966; LOL, 17.183; NPM, 13.649; FTK77, 10.775; DAM, 16.980; and NSS, 5.4485, 8.090, 12.135, 16.180, 20.225, 25.590. THOUGHT FOR WARD 78

"At present, VHF repeaters are spaced 25 kHz apert as are the "S" (simplex) channels, with 50 kHz spacing on UHF. It seems to us that we are laying ourselves wide open to the idea that amateurs on the VHF/UHF's will not be assigned bands in the future, but a few spot frequencies. Are we not inviting this by this obsession with 'channels?' What is there to stop a non-amsteur faction proposting that the two metre band be halved and the amaleure allocated a few channels at 12.5 kHz specing. In the UK, there is a concentration of SSB activity in the 144.15-144.35 MHz region, followed by a relatively little used band from 144.35-165.0 MHz. To make a case for the retention of the present 2 m band, we must make more use of this wasted space". Edit, in Mobile News May '78, And, by the way, in the UK they only have 144-146 MHz as their 2 m band.

DIVERDID GAMES

QST for June '78 has the news that special agree-ments will permit the handling of third party messages during the Olympic Games in Montreal from 3rd July to 15th August. The apocial agreements negotiated to that date were between Canada and 32 other countries of which Hong Kong, Korea and the Philippines were the only ones in Section 3. Incidentally, on this subject the same issue carries on article shout the dennare at ITII conferences an arriche about the dangers at 110 conservices of third party traffic, and quoted this as the explanation why one African delegate voted against amaleur radio at the 1975 Space Conference.

WIANEWS

Central Office was bombarded with letters during June on a number of 1976 Convention Motions requesting various amandments to the Handbook.

Several more are still in the nine-line for further work to be done on them

June was a quiet month on WARC 79 as the agenda for the Conference is expected at any time.

A new development on the Australian CB scene put in an eonearence during June when a group in Sydney progrised a meeting on the 10th to leunch the promotion of a CB service by legitimate methods. The alleged pirates concerned publicly stated they had ceased their transmitting activities in order to achieve their goal.

The Institute cannot condone pirate operations because the amateur service is a legal service and must operate within the law. The attempt to obtain legality of CB operations is too new to draw any conclusions except that the changed situation will surely be of considerable interest in many ways. It has not passed unnoticed.

There was an interesting editorial in April QST about their own legal CB service in the USA which merits study by those who might seek to update themselves on the subject.

Mr. Roget, VK3YQ, a member of the Executive, attended the NZART Golden Jubilee celebrations in Auckland early June. A letter from him referred to the address given by Dr. William Pickering head of the Jet Propulsion Laboratory in California and himself a Kiwi and an amateur of long standing. YK3YO commented "one message clearly spelt out is that digital communications is a must for the future Another speaker at the Auckland conference was the New

Zesland P.M.G. who announced that Novice Licensing would take effect there from March next year - one year tenure, 6 wpm morse and lower grade technical requirements

At the June Executive Meeting the Federal President, Dr. Wardlaw VK3ADW, announced his intention to attend the CO Convention in Rockhampton on 28th/29th August and hoped to visit both Townsville and Brishane whilst in Queensland II local amateurs in those centres might fike discussions.

At their June meeting the VHF/UHF Advisory Committee finalised recommendations for beacon segments and these are now in the hands of Divisional Councils for comments. Another Item was the preparation of submissions to the P and T. Dept. relating to the Broadcasting Inquiry.

The Executive also received a proposal from the Federal WICEN Co-ordinator, VK1QJ that the primary channels for WICEN nets should be 3600, 7050 and 14100 kHz plus secondary channels. This is also in the hands of Divisions for comments. VK1QJ attended a seminer at Mt. Macedon and commented afterwards that all services should have no doubte about what WICEN is and can do.

Publicity for the WIA was another metter finalised along with a recruiting drive. Members should therefore expect to see advertisements in all the main Australian Electronics magazine during August and new recruiting folders should become available at the same time.

A videotape was made of the immensely interesting lecture on aerials by G6CJ, "Dud" Charman, given to members of the VK3 Division late in June. When this has been edited and copied VK3 Division late in June. When this has been stilled and library is to hoped it will form the nucleus of a Federal videotape library for controlled use at group meetings.

OSP

EXAM BYLLABI — USA 'The FCC in its continuing efforts to maintain a

meaningful and equitable examination program for the Amsteur Radio Service, is releasing new study ouldes. They are in the form of a syllabus which cutlines the various categories of questions from the examinations are devised, and include sample questions representative of those appearing in the actual examinations. In the peat the FCC study guides have contained questions which, until recent years, were generally not arranged in any reasonable or logical fashion and usually quite similar to, or even identical to, those found in the examinations. The new study guides will reduce the possibility that an individual may acquire an amateur radio license eimply by memoriaing the answers to these specific questions without being otherwise qualified. Additionally, the new guides have been designed to permit much greater flexibility in the selection of examination questions. Rexibility allows more frequent revision of amateur examinations and therefore results in a more equitable examination program". Worldradio Nows April '76

MORSE CODE TEST - USA "Instead of the present morse code testing method, the FCC will administer on a limited, trial basis a

multiple choice examination covering a five minute transmission of plain text. Such a text would re-lieve the applicant of the tedious burden of copying one misute of mixed text without error, yet would provide an accurate gauge of his competency in the reception of morse code message content, the FCC said." Worldradio News April '76.

The editor of Mobile News reports in the May "78 Issue receiving a letter from their licensing authority that special authority had been given from time to time to use the double sideband suptime to time to use the double aideband sup-pressed carrier mode by radio ameteurs but a decision has now been made that this will be discontinued. It is stated that this is a mode of transmission not permitted by international radio regulations and it is difficult to monitor without special equipment.

OSL ADDRESSES

in the list on page 5 of AR June 1976 there was a misprint of the street name for VKS outwards bursay Mr. W. L. Jackson. The name should be Malane Street and not Malane Street as orined.

RFI LEGISLATION - USA "Most consumers do not understand that when they

may encounter interference with their home television or radio set after an amateur or citizen band radio operator moves must door, the source is not a defect in the equipment of their neighbour, but with their own radio or television receiver. This interference can be corrected in almost all cases by the installation of simple filtering or shielding parts and could be accomplished most efficiently and economically If it were done by the manufacturer". Introductory remarks by Secalor Barry Goldwater, K7UGA, to his RFI legislation for the US Senate as recorded by Worldradio News

RFI COMPLAINTS - USA

The FCC now finds that 80% of the RFI complaints involve transmillers operating on frequencies assigned to the Citizens Radio Service, and complaints involving ameteur stations have increased from 4% in 1975 to 7% in 1976 according to a spokesman of the FCC Enforcement Division as quoted in Worldradio News April '76. Most of the amaleur station RFI complaints are attributable to audio rectification and front-end overload in telesion receivers, and hence, are due to design deficlencias in the home entertainment equipment. Roughly 50% of the 24,418 electronic home entertalement device complaints involved TV receivers An increasing number of individuals are now noted to be taking their complaints directly to their rep entatives in Congress rather than to the FCC Another item reported was the problem of power interrupters (which senses and corrent from one or two mA between the hot side of the AC mains and ground which immediately and automatically opens the circuit) being triggered by transmitters.

SPEED TRAPS - USA "A resolution adopted by members of the Albany

Amateur Radio Association at a recent most declares that 'It is not in the spirit of Ameter Radio to report the location of police highway rader installations". The resolution pledges mem-bers to refrain from transmitting such warnings over their Amateur Radio equipment. It points out that it is the purpose of all radio ameteurs to co-operate in upholding our tradition to support the lews under which we operate". Worldradio News

MORRE CODE REFERM

"The proof of eligibility (Radio Club of America 5 star citation) for membership rests with the ability to answer the 80 wpm questions properly and with accurate comprehension. Faked up responses are easily detected. Bill (Elist) said that what sets this method spert from the teletype method is the extension of the customery method of CW breek-in conversations. Most of the contacts are around 7035 kHz or 14035 kHz, and added that CW at super speeds will get there when single bus-band won't. WZKFA who attended the meeting of the club is capable of reading 100 wpm". Worldradio News April '78.

"The Guatemala earthquake was a tragedy of enormous proportions to the people in Guatemala. What is less obvious, however, is that many people in the New York metropolitan area suffered deap anguish as well. Their concern, of course, was over the safety of friends and relatives in Gusternals. Normal telephone communications were maia. Normal temporal communications were severed completely. Government apercias were unable to help. All of the local police, fire, public works and citizes band radio systems were totally of no avail. Only amateur radio was in a position to help, and help it did". Worldradio News April 76. WICEN activities in VK need your help also.

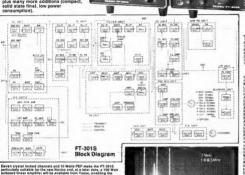
HEIGHT RESTRICTIONS ON TOWERS - USA

"The City of Maplewood, MN recently amended its zoning code to specifically exclude an Amsteur Radio lower from the classification of a building or a structure. Therefore, Maplewood amsteurs will not have to seek a variance every time they want to put up a tower over 30 feet", FCC regulations allow antennas up to 100 feet in height. Worldradio News April '76.

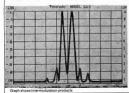
Latest addition to the YAESU line — FT-3015 ALL SOLID STATE

The FT-301S is an advanced fully solid state H.F. SSB and CW transceiver covering 160 mx thru 10 mx, including one auxiliary band and WWV, It has all the outstanding features of Yaesu's top performance FT-101E (Inc. built in RF Processor) plus many more additions (compact.





Beven crystal locked chennels and 10 Watts PEP make the PT-301S. pericolarly saliable for the new Norloc and, at a later date, a 100 Watt TP-701S to be spread for full Science operation. Additional pipe features include successful high YSTMP periodic of the final amplifier output researcher and excitable YSTMP and ST MIC calibration. Special care is especial double section Low Pass Filters for each band. Slocks of the FT-301S are appointed toward the end of Spelamber.





Technical Data

40m 7.0-7.5 MHz. 20m 14.0-14.5 MHz. 15m 21.0-21.5 MHz. 10m A 28.0-28.5 MHz. B 28.5-29.0 MHz. C 29.0-29.5 MHz. D 29.5-30.0 MHz. WWV 5.0-5.5 MHz. Aux. 27.0-27.5 MHz.

Mode LSB, USB, (A3J)

COR. Nov. Timor. Impair Power A1, A33, 20 Wats D D Carrier Bupp. Batter than A0, But Batter than A0 Beater than

Mic Impedance

Selectivity ISB —GdB at 2.4 KHs -60dB at 4.0 KHz -60dB at 0.6 KHz * -60dB at 1.2 KHz

—60dB at 1.2 KHz Crossened Better than 60dB with a 20dB signal at the ant. terminal 20 KHz away Audio Output 3W at 10% 100 Output insections

4 Ohms.

Supply Voltages
DC 13.5V Receive 0.4 Amp

Transmit 3 Amp (at 10W)
AC 234V Receive 40 VA
(Mith FP-301) Transmit 110 VA (at 10W) (With PP-301) Transmit 110 VA (8) Demensions 280mm wide, 125mm high, 290mm

Anticipated Prices FT-301S Transceiver \$549 FV-301 Matching VFO \$120 FP-301 Heavy Duty AC Power Supply \$130 May also be used to power 100W final



on St., Box Hill North, Vic. 3129. Phone 89 2213 all States and A.C.T.

THE SMALLER THE RETTER

Many modern cars, although they have dash layouts looking like aircraft cockpits, do not leave much room for niceties such as amateur radio transceivers. The following article should enable you to keep sweet with the XYL as well as giving you an insight into miniature techniques.

The unit described is a 2 watt 2 m transceiver, basically an "AR" carphone, and is not designed to be a true portable, but to occupy as little space as possible consistent with sensitivity and power output. The whole idea of the project was to

condense already tried and true circultry and lavout, and come up with a smaller unit

While the original PC boards were a truly professional presentation, they can be made smaller. This is accomplished. In my case, by using a spirit based pen, and with an original PC board, laid out in front of me, drawing an exact replica of the original straight on to the new board



Not much larger than your fist.

to be dipped. Mind you, it may not come out as you want It first go, but that is the fun of it.

When the RX and TX boards are to your satisfaction (and you have not missed any components), lay out the boards as they

would appear in your intended layout. Naturally, all circultry must be near the associated switching. You would not have the TX crystals on the other side of the case to the switch, would you?

Most of the boards in my rig have been mounted on their sides giving the rig a very low profile. "K" style crystals have. been used throughout, and the TX uses the exact crystal switching and modulation process which I inserted in AR of September, 1975.

The case is the showplece of any place of equipment, so it should be made strong and as neat as possible. Approximately 4 hours previous to writing this article the last screw went into the rig and it was air tested. The sensitivity is quite good and an air-test with Bruce VK3UV, using his "Ken" (both ways 2 watts) was very pleas-

Although not at present a true handheld, a battery pack and rod antenna is to be installed and used for hand-held operation

Also, the rig will have a switched channel to come out on 145,000 neat, which was triple via a varactor to 435.00 MHz. the 70 cm FM net. A converter will be incorporated to come back to 145 for receive. As the output on 435 will be in the vicinity of 1/2 a watt, a solid state RF amplifier will probably be incorporated to boost the power to a useable level.



Inside Don's transceiver, showing the extensive use of vertical printed circuit boards in conserve space.

Photos: Ken Reynolds hotos: Ken Revnolds

THE G6CJ AERIAL CIRCUS

At least 200 Melbourne amateurs were present at the Debney Park Community Centre on the night of 23 June, in response to what had been described as "the chance of a lifetime" to hear and see one of the most notable lectures to be presented to VK3s for many a year.

The Divisional President, Phil Fitzherbert VK3FF, introduced to the audience Mr

F. J. H. "Dud" Charman B.E.M. (G6CJ), a CW operator of long standing, who is not only a professional engineer with EMI but has spent many years developing and presenting to amaleurs in many countries his unique demonstration of aerials in action. This was the 136th time that Dud has displayed his "aerial circus" to an amateur audience, and the equipment has evolved over the period into the present "Mark 3 solid-state" collection.

Dud began by explaining that the whole concept of the performance was to show by the use of models operating in the 3.3 GHz band all the radiation pattern characteristics of many types of aerials. At a wavelength of 10 cm the models themselves could be simply and quickly made from 18 gauge tinned copper wire and bits of plastic, so that even quite complex arrays and their feeders formed a selfsupporting assembly. Balanced feed was

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used to all driven elements, with the twoview transmission lines having a Zo of about 200 ohms. The RF output of the generator was modulated by an asolia tone (the traditional 400 Hz) and the radiated power distribution investigated with a handhald probe desector which fed lets as audio ampiller. Thus the audicence could varied with the relative position of probe and series.

Beginning (no surprise here!) with the half-wave dipole, we were quickly shown the significance of polarisation, and the traditional doughnut shape of the pattern was verified, it was shown that the "freespace" radiation decreased smoothly as the probe was moved away, but if a reflecting plane was set up a little distance from the dipple the field between them then exhibited standing waves. This led on to an assembly of two driven dipoles at halfway spacing and 180 degrees phase difference, producing maximum radiation in their plane and a null at right-angles to it. Since Introducing a plane reflector at the null produced no change in the pattern, the assembly was revealed most elegantly to be equivalent to a single dipole above earth plus its virtual reflection-produced companion below the earth plane. From here on a metal-topped table was used to represent the ground above which all practical serials must operate, and the effect of height on the number and elevation of the pattern lobes was clearly demonstrated.

More complex aerials were then investigated, such as long dipoles, long wires, vees and rhombics. Multiple drivenelements then led to the parasiticallyexcited Yaoi arrays, again with emphasis on the relationship between pattern and height. Dud then transferred his attention to slot radiators, showing the current/voltage and polarisation duality between the slot and the dipole. He showed that the slot plane could be allowed almost to disappear (like the smile of the Cheshire cat!) leaving us with the well-known skeletonslot, and then evolving into the quad. At this stage he passed on to multiple-dipole and slot arrays as used in radar, and



"Dud" Charmen demonstrating his work under the watchful eye of the television camera.

showed how minor lobes could be controlled by proper proportioning of the element currents.

After briefly touching on some sappost of guided waves, the climax of the display was reached with the introduction of circular polarisation and helical sortials. The interpolarisation of the same sense was shown convincingly; but then, when opposite-sense sarrials worked perfectly via a reflecting plane which obviously reversed the long plane which obviously reversed the long plane which obviously reversed the programment of the programment of the procuration of the programment of the procramment in a blaze of glory and preformance in a blaze of glory.

In the question time which followed, Duddisplayed again his encyclopeadic knowledge of his subject, and it seemed that all those who asked questions were more than satisfied with the answers they received. After a vols of thanks moved by the Publicity Officer, John Adocok VRSACA, the During the subsequent lengthy period of coffee, blocuits, and rag-chewing, all of Duffs "stoch-in-rade" of sundry hardware and tiny serials was inspected with great interest, and Dud himself was occupied with informal enquiries and discussion for the best part of an hour.

Thenke to the prior organisation of Peter

Thanks to the prior organisation of Peter Wolfenden VK3ZPA and his enthusiastic group of ATV operators, the whole of the formal part of the evening was recorded on video-tape, and it is hoped that this can be played to various meetings, conventions etc for the benefit of all those who were unable to be present at the "circus" themselves. Many of those who were there will also look forward to an opportunity to see It all over again. Like all good lecturers GSCJ possesses the ability to make it seem so easy at the time, but in retrospect there was so much information packed into the presentation, that this writer freely admits to some bewilderment at its scope. One could not afford to relax concentration even for a few seconds without missing some point or other.

If you have any interest at all in aerials, if you would like to understand them better without being confused by a mathematical smoke-screen, and you have a chance to see "The 8GDJ Aerial Circus" either live or on the WIA video-tape, then DON'T WISS IT! VKSABP

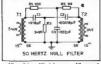
50 HERTZ NULL FILTER

Ron Cook VK3AFW

Perhaps you have a tape of the last VKG opening on 482 but when you replay it, somehow the signal is aimost killed by a 50 Hz hum picked up when recording. Do not despair, build this circuit and playback through it. It consists of a twin T notch, see figure 1, and will reduce the hum by 40 to 50 dB. Better still, play the tape through the filter and record onto another tape.

FIGURE 1

T₁, T₂, 5 K ohms to 15 ohms speaker transformers.



All realistors 1% tolerance. All capacitors trimmed to within 1% of value.

For other frequencies, say 100 Hz, we compute new values of C1, C2, C3, as follows:

If other impedance trensformers are available it is suggested that you use $R_1=2$ Z, $R_2=100$ R_1 , $R_3=0.99$

 $R_1 = 2Z$, $R_2 = 100$ R_1 , $R_3 = 0.99$ R_1 .

In its usual form, the T fiter uses R_1

In its usual form, the 1 litter uses H_1 $= H_2 = 2 \, R_3, \, C_1 =$ and $C_1 = C_2 = C_2/2$. However, a greater notch depth is

claimed for non-symmetrical cliquit,

Amateur Radio August 1976 Page 7

And now a few words from Arie Bles, VK2AVA of SIDEBAND ELECTRONICS

IMPORTS & SALES.

In 12½ years of business operations since early 1964, I have imported and sold:—

- 1400 HF transceivers: Galaxies, Swans, Yaesu Musens, Unidens, Trios, etc.
 - 800 plus VHF transcelvers: Kens, Kyokutos, Including some 50 Icoms.

1000 antenna rotators.

- 1000 plus beams, vertical multibanders, etc.
 - 600 Barlow and other all-band receivers, plus scores of other smateur equipment.

My policy of bringing prices down, or keeping them down by open competition with others, if needed, has generally been appreciated and supported by ally been appreciated and supported by Ameteur Freternity, Without after-sales service and honouring all warranty claims I could not have lasted that long. Locened amative are usually shread buyers and not the easiest type of customers.

But, of course, this action has worried a number of other dealers.

However, I shall continue and, II indicated, even expand my activities, regardless of semi-retrement. I am now leaving the retailing to Peter Schulz, VKZZKL. With this, Peter will continue to get my commercial, financial and technical backing and the benefit of my wholesale imports.

Honest trading with a limited profit margin has been and will continue to be my policy.

I shall continue to be on the alert for new interesting overseas developments and am proud of having coached Yaesu Musen into developing the Wadley loop FRG-7 receiver!

Arie Bles VK2AVA
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AD

BETTER PERFORMANCE FOR YOUR HEATH SB650

John Ingham, VK5KG 37 Second Ave., Setton Park, S.A. 5083

The Heathkit Frequency Display Model SB650 has proven to be one of those little luxuries that quickly turns into a necessity! The ability turns expensely net to a frequency by sight alone will be appreciated by any ham who has ever kept a sked.

However, after some months of operation, several flaws became apparent in my unit which appeared to be not faults as such, but characteristic of the model in general. Conversations with several other SB650 owners confirmed this to me, and led me to investigate ways of improving its performance. In particular, the problems encountered were.

 Overheating which led to an incorrect count whenever the unit was operated at an ambient temperature slightly higher than normal room temperature.

Occasional random variations in the last digits exceeding that specified by the manufacturers.

In addition, I felt that a further decade of resolution would be an advantage (i.s. to obtain a readout resolution to a 10 Hz instead of 100).

The solutions I have come up with to these problems are separate and do not rely one upon the other. For that reason I will describe them separately even though they can be tackled all together if so dealred.

Heathkit specify a Maximum Ambient Operation Temperature of +40 degrees C. (112 degrees F). They also recommend against setting the SB650 on top of heat producing equipment such as receivers, transmitters, etc. Even when such advice is complied with, the average ham operating area can get quite hot, and it only takes (say) the summer sun shining through a window on the unit to lead to problems. I have measured an interior air temperature of over 155°F under these conditions. and certain components, notably the power transformer, get too hot to even touch! The cause of the overheating is obvious at a glance; the unit is enclosed in a double shield with no provision for ventillation at all. Even though it draws only 15 watts, with such good thermal insulation it is no wonder the unit gets so hot.

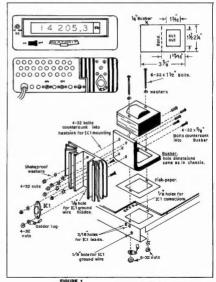
Heathkit engineers have obviously utilised a double shield for a purpose. However, I have had no trouble with RFI to or from the SB650 since I carried out the following modifications.

As can be seen from Fig 1 the power transformer is mounted on a bent strip of copper or aluminium bus-bar which is altached to a regular finned aluminium heat sink. The bus-bar is thermally insulated from the chassis by the use of a sheet of fish peper and no part of the box or back panel is allowed to come into contact with the bus-bar/heatsink combination.

The bus-bar (34" L x 214" W x 14" hink bus-bar (344" L x 214" W x 14" hink gar probably be obtained as scrap from a local electrical contractor while the heatsink is a Wakefield Engineering Inc. No. 641K1. Cut 9/15" off one side of the heatsink, and file the corners round so that it will file seally into the outer case.

Now remove a notch 15/16" H x %" W from the bottom corner of the other side so as to preserve clear access to the LMO socket.

Remove the rear panel of the SB 650 and cut off the right hand end to match the heat sink. Now perforate the panel with 36" holes above and below the chassis to allow a reasonable degree of airflow. The regulator integrated circuit CCI is re-located onto the bottom of the heatsink and re-connected to the original wires which are fed below the chassis via



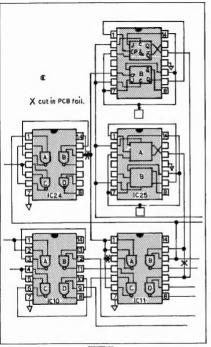


FIGURE 2A

four '%" dia holes drilled alongside the power transformer. for IC1. I put under its lower mounting nut a solder lug connected to a wire which

In order to ensure a good electrical (as opposed to thermal) chassis connection the chassis (via a small hole drilled for the purpose) and grounded to another solder lug under the closest transformer mounting nut.

I recommend the use of silicon great wherever good thermal contact is required. I used International Rectifier Silicon Heat

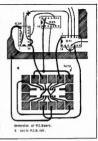


FIGURE 28

Sink Compound No. SH 119-C. The difference in the interior tempera-

ture of my SB 650 after these modifications was incredible and I have had no overheating problems since. However, the key to success in this matter lies with the use of the fish paper. The first time I tried. I took no particular measures to legiste the heat sink from the chassis and the results were disappointing.
When I first built the SB650, I was aur-

prised to note that the readout would on occasion lump by as much as 600 cycles. For some time I assumed that the cause of this was other than the counter. Then one day when I was using the SB650 as a straight frequency counter (by using only the HFO input) an odd thing occurred. Whenever I fed in a frequency ending with a 9 tending to a 0 the last digit would "blur" and show all 10 figures simultaneously! When I re-connected the HFO and LMO Inputs I discovered that the readout was jumping up and down by 500 cycles

The reason this effect is not often noticed in normal use is that the HFO oscillator in all Heathkit SSB rigs is crystal controlled and it is unlikely that its frequency will fall onto a number ending in between 9 and 0.

If you have experienced this fault with your SB850 (probably on one band only) you can correct the situation by slightly retuning the HFO oscillator plate coil for that band. However, I wanted to see If I could find a permanent cure for this problem. A close look at the schematic reyeals that in order to count the frequencies Involved, Heath have used a divide by 4 scalar

To compensate for the reduction in frequency of the inputs, they have used a clock period of 4 times the expected rate. The readout is still correct, but the counters only have to work at 1/4 of the speed! Now aithough the scaler (IC25 Dual J-K

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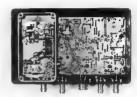
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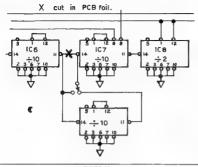


FIGURE 3A

flip flop) is reset at the end of every complete counting cycle, it is not reset after each up or down count. So if there is still a count "left over" in the scaler at the and of the up-count, it is still there when the scaler starts counting for the down-count.

To confirm this I connected two up-down counters (and their decades) in parallel as per IC-12; however, on one of these decades. I tied the count-down input to + 5 Volts (as specified in up-down counter SN74192N spec. sheets2). I then fed a signal into the HFO input of the SB650 while terminating the LMO and BFO inputs. The result was that sometimes the two decades read the same digit and sometimes the normally connected decade showed one count lower than the other.

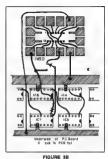
I therefore concluded that a stray count was getting from the count-up circuitry into the count-down circuitry. To overcome this I undertook the modification shown in Fig 2 which in effect gives the down-counting circultry a different divide by 4 scaler from the up-counting circuitry.

This modification worked perfectly as expected right from the beginning. The fact that it makes such a difference in the final digit stability (in both the "normal display" mode and "frequency counter" mode using only the HFO input) is proof that it should have been included in the original design.

The extra duel J-K flip flop is a SN7473. mounted on a 14 pin dual-in-line socket soldered onto a small PC board 11/2" x 21/4" (available from Tandy Electronics cat. no. 276-1803).

The PC board may be installed alongside IC11 on spacers from the chassis. The schematic and connection diagram for this modification are shown on Fig 2. The foil on the PC board has to be cut only twice. not three times as you would expect from the schematici

The final modification is the most straight-forward of the three (see Fig 3). It involves the insertion of another divide by 10 counter between IC8 and IC7 (both divide by 10 counters) in the clock circultry. This increases the cycle time to 1.6 secs. and the resolution to 10 Hz. The IC is an SN7490. A double pole, double throw, centre off, switch when mounted to the left of the display on the front panel may be used to select either 100 Hz or 10 Hz resolution. The centre off is useful for



"freezing" a readout for recording pur-For those who consider the extra effort

worth it, the spare set of switch contacts may be used for changing the decimal point. A small hole may be drilled through the light shield between the 2nd and 3rd decades to the right behind which a NE-2 neon may be mounted. Use a black felt tipped marking pen to blacken the edges of the hole

The physical mounting of the extra IC poses a bit of a problem. I mounted mine underneath the chassis on the circuit board shield using the same IC socket and PC board as used in the modification above Although | am not particularly happy

about the long leads I used to allow the circuit board shield to be opened. I have had no trouble with this circuit. In fact the modification worked immediately and has proved very handy,

I strongly recommend these three modifications to any Heathkit SB850 owner who wants increased accuracy and reliability from his unit.

TOTAL DESIGNATION AND ADDRESS OF THE PARTY O

- Wakefield Engineering Inc., Audubon Road, Wakefield, Mass. 01880 Semiconductor Cooling Div
- 2. Or ref. Page 72 of Heathkit SB650 Assembly

Ray Johnson VK2AVR

FOR THE FTIOIR FOR FIXED FREQUENCY OPERATION 1. Select desired frequency and note the A much simpler method of choice than that

CRYSTAL SELECTION

reading of the tuning dial - black scale only.

2. Subtract the dial reading from the high value of the internal VFO (9200 kHz), This gives the mean value of the crystal

given in the handbook follows:

3. For LSB operation add 1.5 kHz. For USB operation subtract 1.5 kHz. For AM/CW subtract 0.7 kHz.

The chosen crystal will operate on all bands at the same equivalent scale posttion.

EKAMPLEE

80m Band. Chosen frequency is 3.592 MHz, crystal value = 9200-92 - 9108 kHz (it would also give 7 092 MHz on the 40m band) for LSB operation, value - 9109.5 kHz.

20m Band. Chosen frequency is 14.219 MHz Crystal value = 9200-210 = 8990 kHz, (It would also give 21,210 MHz on the 15m band, and 27,210 MHz on the 11m band). For USB operation, value = 8988.5 kHz

DETERMINATION OF BAND CRYSTAL If it is desired to substitute one of the bands for listening purposes, the crystal for

the new band can be found from the following Information.

Fixed IF - 3.18 MHz, Internal VFO - 8.70 to 9.20 MHz.

That is: 1st (variable) IF = 8.70-3.18 = 5.52 MHz, to 9.20-3.18 = 6.02 MHz. Hence, band crystal value = band range limit plus IF limit.

TUNE TO 40 METRES.

David S. Down, VK5HP

CONSTRUCTION

Four Rangoon canes, properly weatherproofed, are fixed by U-bolts to a 15" by 15" square of 1/4" marine plywood in the familiar X-beam configuration. The canes are standard fishing rod blanks as used in some quad constructions.

Four lengths of 300 ohm TV ribbon are required for the elements, which initially form a square 17' 5" per side and secured to the cane tips. Either open or standard ribbon can be used, but ensure that whichever it is, it is firmly secured to the canes and kept from twisting.

The next step is to measure exactly halfway along one side and cut the ribbon to create the feedpoint. Feeding can be with 300 ohm ribbon, 600 ohm line, or coaxial cable plus balun. I used an antenna tuning unit with the ribbon feed at first, and it worked just as well as the coax feed used at present.

Both the sides of the X-beam square adjacent to the feed point side, not the side opposite, are also cut exactly midway along, and two pieces of standard tagboard, each of two lugs per side, are used as insulating spacers. One insulator is inserted in each of the two cut sides, ensuring that each side is divided in two by folding the now exposed ribbon ends together and soldering to the teaboard lugs. Precise adjustment is done with the aid of a GDO, and an assistant, if possible. All tuning at this QTH was done with the antenna atop my experimental 30 ft. tower.

PERFORMANCE

The SWR across the 40 metre band (CW end anywayl) is better than 1.5:1, and to date I have regularly and reliably worked Japan, USA, Canada, VK2, VK3, VK6 and ZL on 40 CW with RST reports ranging from 449 (JH6URN) to 599 (VK2YK) and all transmissions have been with 15 watts input or less!

As with everything, there has to be the bad news. So there is with this Forty Metre X-Beam - it also works well on

EXISTING INSTALLED CRYSTALS EXAMPLE 1 - 80M BAND

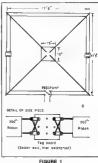
Range - 3.50 to 4.00 MHz. Band crystal

(a) 3.50 + 6.02 - 9.52 MHz. (b) 4.90 + 5.52 - 9.52 MHz.

EXAMPLE 2 - 15m BAND

Range = 21.00 to 21.50 MHz. Band Crystal - 21 00 + 6.02 - 27.02 MHz

If, for example, one wished to substitute range 2 50 MHz to 3.00 MHz for a I ttle used band, the new band crystal would be 250 + 6.02 = 8.52 MHz.



Twenty! During November 1975 (the time of writing this article) using the same antenna without modification on 20 metres CW, 3 watts output, from a good takeoff, I have experienced DX pre-ups from which up to 22 stations have been worked in a string, including JA, UA, G, YB, DJ, HA, HB, UT, UC, OH, UB, OE, DL and DK and K/W lands. It almost makes me hesitant to re-install the 40 and 20 metre 2 element quads!

Anyway, the purpose of the exercise has been achieved; namely, a gain-providing, directional antenna for 40 metres (with the 20 m bonus) that is cheap and easy to construct, can be readily manhandled up and down towers and ladders, yet still leaves room for the perfection.st to improve upon. Anyone for stacked 40 metre X-beams?

In conclusion, to those who run full power to multi-multi-element arrays turned by Ferguson tractor engines, may I suggest that you do not know what fun you are missing out on! See you on forty,

MY WAY

If we are all agreed that it is primarily the antenna system which "makes or breeks" a good QTH. then we can learn much from 5HP's successful antenna development.

Although only licensed in July this year, my experience in operating CW and asso-clated antennas goes back to 1964 when I joined the RAN. As a CW ship to shore operator, I was spolled, Collins 5 kW TX, Racal RA17 RX, two log periodics and full-size rhombics switchable every 15 degrees were all at my fingertips From the sublime to the ridiculous, and

my first 5HP transmissions were with a vertical and a horizontal dipole. Not wishing to outlay tots of pennies on geer, I started hunting for antenna inapiration, and with the assistance of articles on the VK2ABQ Triband Beam, I found it!

HIGHDIN IN EMENTS At the time I had developed a 2 element

ruad for 40 metres utilising 300 ohm TV ribbon for both elements, thus maintaining the guad at the same size as a 20 metre single conductor version. I was sorting out spider boom construction problems and rotation difficulties, the guad being back on the ground for maintenance (after working very well). This left me without the gain-providing and directional antenna I wanted for 40 metres. Along came the VK2ABQ article Mr. Caton, I do apologise for what I

have done to your original antenna, but mine works too! The VK5HP 40 Metre Beam takes about

2 hours to build, costs about thirteen dollars all up, and can be turned by hand or by rotators such as the Stolle (which I

I will assume that anyone still reading this article is sufficiently interested in antenna development to ensure that they have a copy of the VK2ABQ Beam details (as in Electronics Australia, October 1973),

RH-Cunningham

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A few words from "IZNIBS"

WHAT'S NEW

Nothing really, but reports from our various overseas contacts and principals show that new ideas are in the works for all act vities within the amateur service. We in Australia suffer on two points - we are a small population and when VHF s concerned we have a spread not in keeping with the highly amateur populated areas such as Europa and Japan. Consequently some of the more dealyable pieces of equipment tend to be a compromise when used in Austral a.

By the time you read this we should have first shipment of the new Icom IC215 under way and although unloading problems are causing a bank up n the port of Me-bourne, we should be able to give you a definite advice of delivery around about now The hand-book which comes with this souln ment is in the same easy to read sty e as other publications in the com range, and in case you missed the earter data s just a few A total of 92 solid state devices are used to produce a power cutput of 3 watta in the high position and 0.5 in the low The unit a sty ad exactly the same position. as the IC202 and it is worth noting that the luned between 144 and 146 MHz D all markings are with Japanese channels. The unit income porstee 15 channe s to select from from the channel selector and 3 priority channels from a function switch. The other fortunate thing about t is that the crystals used are the standard IC2O series used in the current 1C22 Power requirement takes about 750 mA in the high power position and alltile more than helf this in the ow power bloads can be used but it has been our experience, that because of the discharge characteristic of this type of battery they tend to go flat without warning and when you need the equipment most, especially 1 you are padestrian portable. Using the recommended dry cells you do get warning of impending shortage of power. Anyway we will wait until we get it and it looks like being a most useful companion unit to the IC22A

UHF AND WHAT'S AVAILABLE

The new repeater pan has a otted an extra channel at 146.05 MHz, but we have had requests for UHF-equipment on the appropriate channel set out at the recent WIA convent on Unfortunately amateur UHF equipment a not subject to the same duty free entry as the such as Icom would have to sell around the \$400 mark. However, by the time you raid this we should be able to offer you a near little transverier unit which will connect to your IC22A, give you 5 walte culput on UHF and with a built-in converter bring your UHF signal down to the 2 metre band. Price heant been decided yet, but it will be relatively in-expensive and will not limit the use of the rC22A for normal VHF operation. It looks to be a fairly simple way out of getting on to UHF and helping populate this relatively unused allocation

Around this time of the year a lot of thought is being given to 6 matre and 2 metre DX contact possibilities and ! you didn't read of our July/August low price advert sements in lest issue try and get hold of t and see what it is all about. These arrangements still stand and apply also to the Atlas. It looks like some good accessories are coming our way from this supply also. If you think of HF mobile give me a call or drop a line and we will give you the latest. With best 73.

PETER VK3IZ

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THE LM3900 PHASE LOCKED LOOP

M R. Haskard VKSBA 64 Mawern Ave., Mayorn, S.A. 5051

The Phase Locked Loop (PLL) has many possible applications for amateurs. This article summarises the performance that can be obtained from the LM3900 when connected as a PLL.

Recently, students of the South Australian Institute of Technology carried out a number of experiments on PLLs using the LM3900 IC. According to National Samiconductor's Linear Appl cation Note AN48, the LM3900 is suitable for PLL applications to 10 kHz

What is a PLL? It is a circuit which produces an oscillation which is locked to a reference signal. If the phase of the reference varies, the locked oscillator's phase is varied in sympathy. The two run at the same frequency Refer to Fig.

The add tion of a mixer circuit would enable, say a 144 MHz signal to be locked to a 5 MHz signa. Because the mixer is isolated from the locked VHF oscillator, no mixer chain or 5 MHz components appear in the output. So PLL systems can be used with highly stable, clean, single conversion VHF receivers, transmitters etc. as shown in Fig 1 (b).

The PLL can also be used to decode RTTY signals. As no tuned circuits are used, the frequency shift of the RTTY sional is unimportant

The circuit used by the students is shown in Flg 2. SPREAD IN PARAMETERS

For the circuit in Fig 2, table 1 summarises the results of 6 separate units constructed. Test conditions are Vs = + 12 volts and VIN = 1 volt. The free running frequency of the voltage controlled oscillator (VCO) is with the input disconnected. The output of the comparator, under these conditions, goes to a high state (approximately 11 volts out) and the VCO runs at a high frequency - near the top end of the lockn range

V _S SUPPLY VOLTAGE VOLTS	VCD FREQUENCY Hz	LOCK IN RANGE	CAPTURE RANGE
7-5	950	269 - 550	306 - 498
10	558	316 - 503	316 - 503
12	562	272 - 561	319 509
14	550	276 - 550	320 - 509
		V _{18.1} = 1 VQ	LT

TABLE 2

OUTPUT VOLTAGES

Typical output voltages are shown in Fig. 3. Output Vo2 is Inverted.

The linearity of the comparator and the

VCO was investigated. The comparator output fell linearily from 10.2 volts to 5.2 volts for a change in phase between the two inputs from 0 degrees to 180 degrees.

The VCO was also found to be very linear. The control voltage was varied from 1 to 20 volts; this produced frequen-

cies from 20 Hz to 890 Hz. INPUT SIGNAL LEVEL When the LM3900 is operated from a 12V

rail the input signal may be between 0.3 and 20 volts. If greater sensitivity is required, the fourth, unused amplifier in the LM3900 package could be pressed into service. The frequency of the locked oscillator is unaffected by input signal variations over the whole of this large range, although small variations may occur TEMPERATURE EFFECTS

The circuit was heated to 50°C in an oven and variations in the VCO frequency, lockin and capture ranges noted. The supply rail was 12 volts and input signal 1 volt. As the temperature was increased from

20°C to 50°C the centre frequency fell from 335 Hz to 295 Hz. The capture range and lock-in range both remained relatively constant.

NOISE IMMUNITY

The student investigating the response of the PLL for varying input S/N ratios (white noise) did not complete this section, As expected the PLL gave every indication of operating satisfactorily in poor S/N conditions.

In the case of impulse noise, some resuits were recorded. For a 1 volt input



Fig. 1A: PLL Block Diagram



Fig. 1B; VHF PLL Block Diagram

signal there appeared to be a noise threshold voltage of 0.9 volts below which the PLL remained essentially in look. When the impulse noise level was above this threshold voltage, the PLL preferred to

VCO HZ	Lock in range Hz	Capture range Hz	DC Current Drain mA	Kp * Phase Comparator Transfer Characteristic Volts / radian	Kybo 2 VCO Transfer Characteristic radion/sec/volt
400	218 - 376	192 40G	64	-186	340
455	220 - 460	247 - 410	6-0	-1-59	564
480	250 - 470	300 420	6-3	-2-0	420
57	345 572	370 556	6-7	-1-85	433
695	339 - 685	408 616	6-2	2-0	436
833	526 - 833	555 - 704	7-9	- 2 5	416

lock onto the impulse noise signal. The impulse noise was simulated using a pulse generator, manually varying (independently) the mark to space ratio from 1:100 to 5.8 and frequency over the range 10 Hz to 10 MHz.

FREE RUNNING FREQUENCY OF THE VCO

Where

National Semi-conductors state that the frequency of the VCO is -

VH s the peak voltage of output Voltage Vol

V- is the valley voltage of output Voltage Vol

Ve being the high output voltage from the comparator

Ver the base emitter voltage of a silicon

For operation from a 12 volt supply typical values are

Values are Value = 0.7 volts, VH = 10.7 volts, VL = 1.2 volts

transistor

fvco = 555 Hz (compare values fvco g ven n table 1).

The free running VCO frequency can be changed by varying R , and/or C1, the

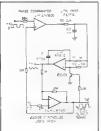


Fig. 2: Circuit Under Investigation

only limitation is that if R⁺/R² is not 2, the mark to space ratio of the output voltages Vo and Vo² depart from 1.1. Tests indicated that by varying the R²C² term, the PLL could be made to operate from below 10 Hz to over 10 kHz. Above 11 kHz, the

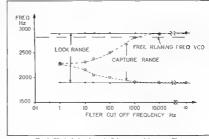


Fig. 4: Effect of changing cut off frequency of low pass filter



Fig. 3: Y Axis SV/cm x Axis .5 m sec/cm

circuit would not operate correctly, the limitations being the switching time of the amplifiers.

CUT-OFF FREQUENCY OF THE LOW PASS FILTER

Changing the cut off frequency of the low pass filter does not affect the lock range, only the capture range. The latter decreasing as the cut off frequency is lowered. For no filter present the lock and captive

TRY THIS

Ron Cook, VK3AFN Bill Rice, VK3ABP

EXPERIMENTAL COMPRESSOR Figure 1 shows the circuit diagram of a

Figure 1 shows the circuit diagram of a compressor 1 built some time ago in breadboard form. The output-input characteristic shows a steep knee, and gain is reduced rapidly when the input exceeds 50 mV rms. Increasing the input from 100 mV to 500 mV torsased the output from 1.80V to 1.95V. Figure 2 shows a pre-amplifier suitable for crystal

ranges are identical Decreasing the cut off frequency of the filter increases the tune to look-in, improves the interference rejection of the circuit, but degrades the transient performance of the system. Fig 4 shows the effect of changing the

filter cut off frequency. In the circuit used C1 = 150 pf, R1 = 1 Mohme, R2 = 470 Kohms, R2 = 33 Kohms, R4 C2 made the verable (See Appendix)

APPENDIX

From "Phase locked loops" Signalics applications note $W_L \,=\, 2 \; K_V \,=\, (K_P \; K_{VGO}) \, \frac{1}{16000} \, .$

$$W_{c} = 2 \text{ KeF (lwc) } N \text{ } 2\sqrt{\frac{R_{V}}{t_{1}}}$$

$$R_{2} C_{3}$$

 W_L is the lock in range (full) in rod/sec W_C is the captive range (full) in rad/sec K_C is the loop gain K_C is the phase comparator transfer charac

Ke is the phase comparator transfer characteristic Kuco is the VCO transfer characteristic From table it the avarage values for Ke and Ky are (Ke) = 1.97, (Kuco) = 438 AVG

Thus W_L = 1754 rod/sec or f_L = 288 Hz and W_G = 738 rod/sec or f_G = 118 Hz These results agree (avoursbly with the second romans given in 1866 1

assured ranges given in lable 1
microphones with input impedance of 2
megohms and gain adjustable from 0 to
25. R may be reduced if gain is occossive
or increased if insufficient.

Figure 3 shows an alternative preamplifier with an input impedance of 4.7 K for dynamic microphones, Gain is adjustable from 1 to 100. Altering R1 will change the upper limit. Both preamplifiers have



some low frequency cut below 300 Hz.

Amplifiers used should be I.C. operational amplifiers of XX741 type.

The output of the compressor amplifier is rectified by the diode D. For signals below 1.2V the 2N3643 transistor receives

very little base current and its collectoremitter resistance remains high. For larger output signals the base current increases, the collector-emitter resistance decreases, causing the transistor to produce a shunting effect on the incoming

4-75 may be allowed to suit macrophose
RIGURE 3.10*NAM C*PREAMPLIFIER
signals. This effectively reduces the circuit gain thus providing AGC or compres-

sion action. No collector supply is reguired for the transistor to operate in

A CHEAP AND SIMPLE EFFECTIVE NOISE BLANKER

The need arose recently, after shifting QTH, to get rid of some reselly heavy QRN created by 33kV power lines.

power lines.

Each time the wind blew, the noise flattened the 8 metre

receiver. Here presented is a circuit gleened from an early RSGB publication, which produces good results for its simplicity. The unit was fitted to a valve receiver

the unit was titted to a valve receiver type FR50 and so is presented as a valve unit (!), however, to FET convert would be simple as you see from Fig 1.

Construction was straightforward and unit was fitted on the near of the chassis. All signal leads are coaxial cable, power leads are conventional. I used the 150V from the receiver oscillator line. AGC is applied to the amplifier valve, V1.

and the range of operation is excellent for all signal and noise levels.

The threshold potentiometer was a 25k switch pot, located on the front panel service pot, located on the front panel through the potential potenti

1st SBAS in the 2nd IF chain.
The noise pulses coming in are amplified by V1 and rectified by D1 and D2 to produce negative amplified pulses at the grid of the 1st triode, V2. In turn these are inverted and fed to the grid of 2nd

Steve Gregory VK3ZAZ 19 Charles St., Surrey Hills, Vic.

this circuit.

triode, V3, which conducts on impulse, and effectively shorts the IF amplifier anode to ground by way of the .001 coupling capacitor and diode.

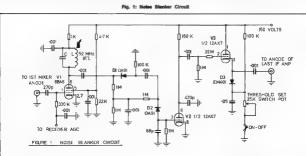
Diode D1 develops a bias in the preence of a signal and conducts when a pulse exceeding this signal arrives. Dlode D2 is capacitively coupled so as to allow only the negative transient pulses through to V2. It shares the blas developed by D1 thus preventing blanking operation on the signal instead of on the noise. The potentiometer forward blass the

diode D3 and effectively sets the threshold level for blanking.

level for blanking.

The "holes" left by the noise pulses are more readily accepted by the human ear than the pulses themselves.

If you have bad QRN and do not have an FT101 with a blanker, try this, it could make things more bearable.



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	-10			October	Is total exchange points my tiplied by sum of my ti-
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AZERBAIJAN "DBBO	254	~K3AAC	182	Awards. Certificates to too scoring station in	with 001. Multipliera for non Europeans are de-
	404	_K3VAR	50	each country and US, Canada and Australia call	termined by the number of European countries
TASHKENT		UKOLAB	18 7050	areas	worked. Multipliers on 3.5 MHz may be multiplied
6B1	240	UKOFAA	2596	Send logs to SARTG Contest Manager, C. J. Jensen, 022CJ, Melsnersgade 5, 8900 Randers,	by 4, 7 MHz by 3, and 14/21/28 MHz by 2.
ZAKH UL7OH		UKOZAF	2538	Jensen, UZZCJ, Meisnersgade 5, 8900 Handers, Denmark, by Seot. 18th.	Final score is the total QSO points plus QTC
UL7QH	2369	LKSCAZ	1394	ORARI SEANET W W DX Contest	points multiplied by the sum of multipliers from all bands
KALINGRAD		UKSHAC UKSACD	658 540	Starts 6001 GMT 21st Aug., and finishes at 2359	A QTC is a report of an earlier confirmed QSO
LA2FAT	84	UK9CAE	350	GMT on 22hd Aug.	sent to a European station later. OTCs must con-
UKRAINE		UKSYAR	132	All bands 160 to 10 metres, phone or CW may	tain time, call, and QSO number of the station
UBSLAY	720	UKSJAK	44	be used, but cross band and cross mode or mixed	worked. A QSO can only be reported once and not to the one pating slation. A maximum of 10 QTCs
UTSLN	44	LASYAQ DKS-AA	44 2508	phone/CW are not permitted. Classification Single band-single operator, Multi	to a station is allowed. QTCs are worth 1 point
LB5VAA	8	UKSJAA	2508 156	band-single operator, and Multi-band-multi-poerator.	each
ASIATIC SSR		UK7GAA	175	Confest call on phone is "CO SEATEST" and	Dead-Inex for ogs are CW Sept 15th Phone,
LA9JAA	871	UK2PAF	2147	on CW is "CQ SEA". Send RS/RST report and	Oct 15th, and RTTY by Dec. 1st Logs should be
LASON LASO	628 839	UK2BAS	1584	a three ligure number starting at 901 and increasing by 1 for each successive contact	sent to WAEDC Committee Postbox 262, D-895 Kaufbeuren, Germany
LASCO LASFOK	839 828	UK2GAC UK2GAR	280 180	by 1 for each successive contact. Scoring Contacts within own country will not be	EUROPEAN COUNTRY LIST
UA0SAL	344	UK2GAH UK2GAY	180 72	counted.	C31, CT1, CT2 DL, DM EA, EA6 E1 F, FC G
UW9WL	202	UK2GJB	55	Contacts for contestants outside SEANET area.	GC Guer, GC Jer GD, G GM, GM Shetland GW.
UA9UF	100	SWL		160 metres 10 points, or 20 points for YB stations	HA. HR9. HRD HV I IS IT "W Beat JW JY
MOLDAVIA		A8890	432	80/40 5 points or 10 points for YB stations 20/15/10 2 points or 4 points for YB stations	LA. LX. LZ. M1. QF QH. QH0. QJ0. QK. QN QY.
UOSAP	50	A9015	80	20/15/10 2 points or 4 points for YB stations Confacts for contestants of the SEANET area	OZ, PA, SM, SP, SV, SV Crete, SV Phodes SV
	-	BRS28431	2840	with outside SEANET area.	Athens, TA1, TF, LA1348 LA2 UB5, UC2, UN1, UB5, UP2, UG2, LR2, JA Frenz Josef Land YO,
LITHUANIA LP2NC	48	35637 35943	216 4922	160 metres 10 points	YU, ZA, ZB2, 3A, 4U1, 9H1
UP2BAU	48	EA83455	49022 30	80/40 5 points	CONTEST CHAMPIONS TROPHY
	•	LA-M5606	988	20/15/10 2 points	As I said last month I hope to produce a list of
ESTONIA		DK3-26558	912	Contacts for contestants between SEANET area	stations and points for the Contest Champon
UR2RDQ UR2RJ	414 310	OK115835 OK326743	396 20	stations 160 meters 6 points	Trophy. The list so far only has points from the
UR2RJ UR2RD1	154	OK326743 SP6.30003	20 550	160 metres 6 points EXEMI 3 points	National Field Day No multi operator or club stations have been awarded points as the troops a
UR2RQJ	115	JA1-19968	564	20/15/10 1 points	stations have been awarded points as the trophy s intended as recognition of individual affort.
			-		and the second of the other second
					Amelous Dadin A 4070 P
					Amateur Radio August 1976 Page 21

OHTNW

OH3XZ

OH6. A

OKZKE

OK1DVK

OKIKZ

OZ7HT

OZ5DX

CZSME

PADDIN

PARTALD

SMOCCE

OK2PGL OZ1LO

OKSKEO

SPADOL

SP7HT SP7CTY

SPECTW

SPOAL

SPSSIP

SP6DB

Y71808

18

32 SP9EVP SP8ECV

2 SPOKET

120 SP2BMX

364 SPSEV

10

460 YZZHDE 57E JACLETICS.

98 JA9-2023

84 Manfred Klug 246 1429703

-

80

94

12

2 DM6721/G

690

12

JA5-1231/3

JA9-2155

DM2703/A

DM-EA-8031

DM-EA-7218

Naomi Odagini/8 1067

1840

2120

1648

288 HAD-31749

432 JA3-8943

400 1.3042

330

CAND DESCRIPTION OF THE SECOND SECOND

DM-8405/N

DM-2703/A

150-57850

15.4 4005

JA4-31769

JAS-1231/1

N ODOGIRI

100

300

234

2222

1400

1636

520

3935

918

40

96

Multipliers for SEANET and outside SEANET

areas, 3 points for each country, and between SEANET stations 2 points for each country Fina acone is the swin of OSO points multiplied by the

sum of coentry Print press
Logs and summary sheets Make out a separate
log for cach of ferent band. All times trust be in
MITTEE. SAME I RAZAK '55-96-19 WORT'S 281-C
JALAN PEKELI-NG BUKIT G.LGGR PE-NAMG,
MALAYSIA Logs should reach the above above
before 30th Dct 1976 Results will be arrounced
at the 6th SCANET Convention on DLAKARTA in

the Republic of Indonesia on 14th November 1978

Awards. The highest accret in each country will

sum of country multipliers

Dolas College VK2CAX VICAY? 8 VK2AHE ė VKTHE WKEDI VKSTX AK3CM VK2ZCT

The next contest counting for the trophy is the RD Contest and I hope everyone who enters has a most en ovek e time and sends in a log to help their Division. See you In the contest

1975 BARTO RTTY Contest results. There were 5 entree from VX and are as follows No. 39 VK5QX, 26638 points, No. 50 VK5RY 16256 points. No. 53 VK5IF 14274 og nts. No 80 VK3KF 19790 points and No. 69 VK5WV on 4774 points.

REMEMBRANCE DAY CONTEST 1976 would I ke to see over 1000 loss this year. This would be only about one in seven smateurs in

Australia. It is not really a very large number, and am sure that more than this number are actually on ear during the contest.

When you send your log, please think of the Contest Manager and put a front sheet with all

current menager and put a front enset with all relevant details on your log check for duplications and correct scoring, and send your log early to P.D. Box 87 East Melbourne. Best of luck to all who enter and may your voices and fiets not expire during the contest.

AWARDS COLUMN

Brian Austin, VK5CA

See ast month's Notes for General Rules for AR) Awards CERTIFICATO DEL MEDITERRANEO/SWL (CDM/ Bill b

1. The CDM/SWL is larged to those SWLs who can show confirmation of a HRD since 1st January 1960 of 14 countries of the CDM list 2 The Award is not divided into classes

HEARD ALL ITALIAN PROVINCES CHAIP The HAIP is issued to those SWLs who can show confirmation of a HRD since 1st January

1049 of (a) a fixed emateur station in at least 40 provinces of the Italian Republic, for Italian SWL (h) a fixed amateur station in at least 30 nen-

vinces of the Its Ian Republic, for foreign

The list of the provinces is the same of the WAIF (see previous notes)

The HAIP is divided into four classes.

(a) Phone — one band
(b) Phone — two or more bands
(c) CW — one band (at east 10 HACs on CW on the same band, the other HRD may be

on Phone! CW - two or more bands (at least 10 HRDs on CW on two or more bands).

DIPLOMA GUGLIELMO MARCONI (DGM) This Diploma is to celebrate the experiments carrad out by Marcori in varous parts of the world and bring them once again to the attention of radio The DGM will be awarded to those who amales.rs have made operant with for listened to those will nes in which Marcons conducted his experiments. It is sayed by the ARI and is free To obtain the D p.oma It is necessary to send to the ARI is log

containing all the details of contacts or histenings made, and (a, 40 QSLs chosen from the localities listed below, or

(b) 35 OSLs chosen from the localities Faled below pus the QSL from the official com-memorative stat or 174FGM and one from any other G Marconi Memorial station (a total of 37 OSL 1

When required (for example G _ London

14 - Bologna, EA7 - Cad co etc) the QSLs must indicate the city or the region of the locality well specified. For the return of the

QSLs send the return postal expenses The DGM can be obtained in AM. SSB. CW. RTTY. SSTV and mixed. There is no limitation to the hand (with respect obviously to normal requi The Diploma will begin 1st January 1973. The first Diplomas will be awarded on the occasion of the 1974 Marconi Celebrations. The list of Dip-Iomas Issued will be published in the official

lournal of the ARI. The OSI's must be seet to: ARI - V Scorletti 20124 Milano Hely The locations to be contacted or listened to

are the following: Country/Region or city/Prefix Capo Verda Isl./ /CR4 Portogallo/Lisbona/CT1 Madeira tel /___/CTS Marocco/___/CMB Spggng/Cadice/EA7

Izlanda/---/EI Francia/——/E Cornes/—/FC Inghilterra/Londra/G Inghilterra/Flatholm Isl./GB Inghilterra/Wight Isl./G Irianda del Nord/- /01 Scozia/---/GM Svizzere/---/HB Valicano/---/HV Italia/Bologna/14 Italia/---/15 Italia/Roma/III Italia/Fondaz G Marconi Villa Grifone/II4FGM

Italia/Torre Tigullio Marconi (GE) IP1TTM Dalia/Sucilia /ITB Italia/Serdegna/ISO Giappone/---/JA Argentina/Busnos Aires/LU-A-D Belolo/-Brasile/Rio de Janeiro/PY Svezia/Stoccolma/SM Sugara (Carland (a) 1994s URSS/Leningrado/UA1 Canada/---/VE1 Newfoundland/---/VO1 Labrador/---/VO2 Aus'relie/Sydney/VK2 Barttude/-USA/Mass /W1

USA/NY e NJ/WZ 112A/Missouri/WD 130 A / Hillianna / Will India/---/VII Gibilterra/---/ZB2 Yugoslavia/---/YU2 Libra/Tripoti/SA -/Memorial Stations/-

> LETTERS TO THE EDITOR Any opinion expressed under this head is the individual opinion of the writer an does not necessarily coincide with that of the publishers.

The Editor, THOUGHTS ON THE ARNOLD REPORT

Although the Annold Report as a whole is well thought out and comprehensive it seems to the that sufficient consideration has not been alway to the fundamental changes which have taken place to Attateur Radio over the last twenty-five veers. The succested name change and a few sentences in the proliminary recommendations about the only specific comments which have been made concerning these changes.
It would be good if those who are interested

in the future of ameleur radio were to look back through some of the magazines of the late 1930s and 40s and realise list how much things have changed I recall a copy of Wireless World which showed an early mobile rig. The first horse carried the operator who had a microphone mounted on a complicated harness fixed to the collar of the horse. ment and a most like a small broadcast tower, and a third horse carried the accessories. In a copy of the RSGB handbook in the 40s detailed instruc-

tions were given for drilling holes in the window

of an automobile in order to fit an seria and lead-in for mobile work. And so on

Right up to the middle of the 1960s it was almost unheard of for enyone to buy commercial VHF equipment "Appliance poerators" were people who used converted wartime surplus

The point is that in those times, before taxis and every other kind of commercia vehicle were about the only person who had these facilities and the had to build the equipment himself. Thus when mobile equipment the ameteur was the only person who could supply it. The problem of pirates hardly equipment one would normally know enough to pass the examination For effective overseas commencation Morse was an obvious asset I not a neces-What is the situation today? There are almost a

hundred thousand two way mobile installations in Assertation atlone, of which the ameteurs form only a tiny minority. Every second vehicle has a VHP whip mounted on the roof and even in the remotest country areas there is, if anything a surplus of two way communication in this situation the Riegal mobile operator can go for his life with practically no change of being discovered The cost of equipment has changed in an equal v

dramatic manner. On one page of a hobbles mage-zine way back in 1928 there was an advertisement for a horn type loud appearer, the latest of its type. One could actually le I one announcer's voice from the other. The price of this 'hi li' speaker was ten pounds. This was of course a amail fortune in those days. On the opposite page was an advert sement for an eighteen Inch hobby complete with chuck and acrew cutting facilities The price of this lathe was - wall for t - elght pounds ten shillings. Try to ewap a loudspeaker for a screw culting lathe nowadays and see how far you get! The unpalateble fact we have to face is that over

the last twenty-five years the smaleur, from having a virtual monopoly on radio communication has become an insignificant drop in a vest see of every imaginable kind of commercial and private facility Add to this the fact that commerce equipment is cheaply and read-ly available to anyone who wants to buy it and we have the a tuation that the old erouments which just fied emaleur radio -

Apart from unusual and except onal silvet one the emergency service contribution by amateurs will be very small. The fact that even the most experienced home constructors cannot compete with commercial gear -- try to build a smaller and more efficient rip than the KP202 for retance - taxes a lot of punch out of the argument that emeteur radio contributes enything to development of the state of the art. One justification, name y that amateur radio has an educational nilicence, is slift valid but the neglect by the institute of the youth radio movement hardly strengthens their argument

What then is left to justify emateur radio? Simply this. It is a pastime and recreation which a better than many others which receive widespread approval. If it is reasonable for vast areas of precious parkland to be set saide so that people can congregate once a week to vell at a mob of men chasing a dirty bt of leather, or at a mob of horses running round in circles, then there is no further justification needed for allocating a space for the purposes of sport and recreation This argument would incidentally go down far this argument wow-a including then the current outmoded and academic arguments normally put forward by the Institute.

There is however a complete change of attitude which will sopper or later have to be made by the Institute and its members and that is in repard to the phoney pseudo-professionalism which at the moment influences our activities if one joins a normal organisation one is not treated as a second class citizen until one has gained some academic One is accepted and evaluated the basis of one's practical contribution to the organisation. The quickest way for the Wireless institute to destroy itself will be to discriminate against the new novice iconcess. It is most noticeable no dentally, that the advocates of 'profeasional standards haver advocate such standards

for thomse yes, such as fer instance putting forward the suggestion that existing amotours should be required to re-pass the examination every five years or lose their I cence.

if the Institute was really looking forward it would envisage the possibility of some purely operator "citizen band" leanes being issued for recreations purposes and work out how such people could be brought into the organization.

To sum up Over the ast twenty-five years the character and purpose of smalleur radio has completely and fundamentally changed and its future ustification will be on a sporting and re-creations basis. The institute and its members will have to discard outworn attitutes and encourage a new type of amateur who has been brought up on commercially built equipment. Finally there must be far more strantion given to encouraging youth rad o groups on both a technical and recreational bas a

Roy Hartkopt VKSADH Scout Association of Australia, Victorian Branch HQ,

384 El zabeth Streat Me bourse, 3000 Vic. The Editor. Dear Sr

Word has reached me that there are radio amateurs who in the past would have been quite keen to participate in that event which un tea amateur radio and scouting for one weekend annually, i.e. Jam-bores on the Air (JOTA), but have not done so because they were not approached by a scout group and asked for ass stance

f this is so in my capacity as the Scout Asso-Victorian Branch Co-ordinator for JOTA, clation a I would like to rectify the situation by making available my name and address and asking that these be published in "Amateur Radio". If interested amateurs would presse drop me a line or pleased to put them in touch with a scout group In their you by.

Yours a noere y Pau Thomas

The Editor.

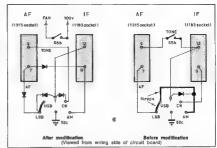
Since the publication of my letter about modilications to the FT 101B AR Dec. 1975, I have

PROJECT AUSTRALIS

David Hull, VK3ZDH

SEPTEMBER PREDICTIONS OBCAR 8 Time Lane COCAR T

	Hd10	Time		080			
Date		2	*W			Time	*W
1			70.00		8210	00.38	59.39
2			83 75		8223	01.32	73.01
3			68.75		\$235	00.31	57 89
4			82 50		8248	21 28	71.51
5			97.50		6260	00.25	56.39
8			81 25		5273	01.19	70.01
7			68.25	7	8288		54.89
8			80 00		8298	01.13	88.51
8			85 00		8310	00.12	53.39
10			78 75		8323	01.06	67.01
11			63 75		\$335	00:06	51 89
12			77 50		8348		
13			82 50		8351		
14			78 25		5373		84.01
15			61 25		8386	01.48	77.63
16			75.00	18	8398	00.47	62.51
17			60.00		8411	01.41	76.13
18			73 75		8423	60.41	61.01
19				19	8436		
20			72 50		8448		59.51
21			57 50		8461	01.29	73.13
22			71.25		8473	00.28	58.01
23			85.00		8488	01.22	71.63
24			70.00		8498	00.22	56.51
25			83.75		8511	O1 16	70.13
26			68.75		8523	00:15	55.01
27			82.50		8536	01 09	68.63
28			67 50		8548	00.09	53.51
29			81.25		6519	01.03	67 13
30	18099	00.35	86 25	30	8573	00.02	52.01



had some inguizies as to details of the rewiring to use an AM filter type XF30B as used in the FR101 receiver Below is shown a semi pictorial sketch showing the circuit as is, and as modified. It is necessary to add two additional blocking diodes and these can be any silicon switching type diodes, preferably with a low capacitance doing the modification it is a good idea also to disconnect 85b and use it to operate the fan es shown so that the fan is not running continuously on racelve. It is however essential to make two modifications to the AF board PB 1315. The 470 ohm resistor. R 17 from pin 6 of the IC. Q4, must be removed from the line to nin 7 on the socket and put to ground. This will eliminate the vox litter which occurs on the CW mode. Because of

Report on Oscar 6, 7 and 6 "operations" meeting, Washington, DC, May 78, WIA Rep., VK3ZDH. This meeting attended by representatives of most of the major amateur satellite organisations, was concerned mainly with command and operational problems of Oscare 8 and 7 and forward planning for Oscar 8.

The meeting was chaired by Rich Zwieko K1HTV Ameal VP operations, who is responsible also for worldwide command station co-ordination. Each command station was reviewed in James of Automation status, coverage, command effectiveness etc., and major problems were discussed in round

It became very apparent that the general policy of using individually owned and operated commend stations, is much more efficient long term than the alternative policy, adopted in some countries, of group operated stations artuated in universities and Group stations have in the past suffered such somewhat from conflicts of interests, and whilst they were generally better financed, tended to awallow up such financing in buildings atc. and not produce in terms of command effectiveness. Remote locations also suffered from lack of instant access to times of emergency. On the other end of the scale countries where the command elitration is virtually a one men band (such as ZL), tended to be sessmodic in operation and difficult to service Command station problems directly offectively effect the operation of the satellites (particularly Oscar 6) over the geographic region of the statio concerned, and this can lead to unrest and ill feeling between regions.

Problems of this nature lead directly to the poor operation of Oscar 6 over Europe in its first 18 months.

Also apparent at the meeting was the reduction in command effectiveness of the Northern hemisphere, compared to the Southern hemisphere. This is a direct result of trying to command with the modifications the line to pin 7 on the socket which will still have the emitters of mic amp transistors Q2 and Q3 connected to 1, will be raised by about 9.7 vol. The affects the bias on the mic amp translators and the base resistor R6 should be altered from 3.3k to 5.6k otherwise there will not be enough mic pain The modifical tions to the mode switch \$20 and to the scoot connections of the IF and AF boards should be clear from the sketch. Be careful to locate the correct tags on the mode switch it a easy to pick correct tags on the mode switch it always to pick the wrong one! Make sure the diodes are the correct way round: The XF30B filter is nalated as the CW filter position exactly as shown in the enstructions for the CW filter XF30C Roy Hartkop! VK3AOH

Ameteur power levels through the ORM and ORN produced by the USA-Europe-Japan mega opol s ' Unfortunately the greater area of the earth's suriem, however the greater relance of 8 on internal computer contro and the normand soph stication of the command link should overcome this. The meeting then want on to review some of

the major experiments conducted on Oscars 6 and These Included -(a) Emergency opating transmitter tests. This is

perhaps one of the most a on figant tests conducted on the emateur bands for some years. Amset was approached early last year by Dr Dan et Brandel of NASA who proposed to use the satell (sa for a ranging experiment using the type of transmitter normally carried by civil aviation a roraft for emargency location purposes

Similar power and enternae to the EL7 trans-mitters were used, but on the Oscar frequencies The experiment proved a great success, even with somewhat primitive ranging apparatus resolutions of better than 3 km were obtained. An accuracy of this nature would slow search authorities to quickly locate a downed plane in the Australian outback or the Canadian northwest. The results have helped Dr. Brande in his teasibility study for NASA in a way that no other service could have provided

(b) Medica Experiments Bill Hook W3QBC outlined the transmission of FKG and EEG waveforms from point to point in the USA and ex plained the service these could provide for treatment of heart (for example) pet ente in remote and emergency conditions. The experiments which were most successful used the technique day sed by David Nelson K7RGE at the university of Arizona

(c) ASCII code transmise on and Remote in nicomputer access rg. These experiments conducted between Randy Smith VESSAT and Dick Alfen WSSXD proved the feasibility of program and data swapping between similar units via the satellities. As this is a fundamenta, plank in the articipated command operation of Cacar 8, the success of his experiment has great importance for Amesat and associates.

and associates (d) Other experients reviewed included a mass broadcasting (to private homes) experiment concided by the hungarians under Prof. Geschwindt of the university of Budapast Mobile in motion seperiments by WQQN/M and the host of school educational experiments conducted under the ARRIL Sala Lis Extraction innormal.

Most of the second day of the meeting was taken up in forward paining for Osciar R. This is one satel file that due to is coverage will require a named ate operations. Based plain from switch of mp emering this through publicity etc. Command Station coation was agen of soussed and it was decided that the base "Osciar 2" sat up (VE years all will be edition of Ve and D. I. would be frost suitable.

INTRUDER WATCH

All Chandler, VK3LC 1838 High Street, Glen Irle, 3146

Since the executor in Australia in 1967 the Invabs and riegra part of Amateur Radio. The des put forward at the WIA naugural meeting was that -- "it is an attempt to preserve the few remening frequencies available to the Amateur Redic Service", and it was sed that — "there is a pressing need to remove intruders from Ameleur frequencies because the frequencies are becoming eded to the stage where Amateurs find difficulty In finding a clear spot to operate', and went on to 'Generally speaking anyone may use any frequency until someons objects. This means that Intruders who use ameleur frequencies illegally may c'a m that they have the right to the fre-quencies because no one has objected", and this is vital at the International lavel. Ameteurs can prove that they have objected to intruders using their bends, they have no once before an International Tribunal. It is thus lenportant that we have a record of intruders and the action we have taken to object to them". This conception is still vaid and the intruder Watch has been organised on a Division's basis with the Co-ord nator resident In Malbourne respons bilty is to co-ordinate all reports for-warded through the Divisional Co-ordinators, so that they reach the Posts and Telecommunicatone Administration regularly for filling, or for action whichever is applicable. Another aspect of his responsibility a the compilation of monthly summaries for no us on in the World IARU Monitoring Service monthly summary

Divisional Co-ordinators are responsible in their respective Divisions for collecting reports from Observers and forward on them on a monthly bas to the Federal Co-ordinator. They are almost or to their Observers and for recruiting Observers and for recruiting Observers. As well as the above The Federal Co-ordinator.

has well as the above the historist Co-definition members in the destination on institutes signals heard in the Anoteur books. With such in mind a star recording has been provided wherein all tape is available to any member who is intreeding anough in the limiting with the members to control the provided and the start of the start of the provided and the start of the provided and the start of the provided and the start of the star

Recently, with the restricturing of the PMG's Department, the ucers in Policy and Operations Bracch has been a order to often a much better a son than in the costs with the WIA in the cying much more co-operation. This is deempined in their request for adopting our report forms so as to comply with their Filing arrangements. The tast been done and the one-tornis will be in tributed by the time this is published in our Maga-

The new forms is now of which was seventhread in May AR are to be used only for stations or signals that can be identified. When I say 'identifled" I mean a call sun must have been copied for A1 (CW) or F1 RTTY, and a verbal identification heard from A3 (AM broadcasting) Our Adminis-Iration is only interested to singular that can be Identified and it is encumbest upon up to supply them with identifications so that they can start their monitoring stations to listen for them. are much too busy with other services, and their requests to be able to look for introders in the Amateur bands. Don't Bunk that the Amateur Service is the only one that suffers from Intruder intrusions. | am told that all services, and incleding emergency frequencies are subject to interference from time to time. However, priority is given to essential services.

With the above in mind a drive has been lead, and of the control who of Deservers. From our Administration's point of view II is essential labor of the control who was a second of the control who was a complete of a complete to any other Administration. We make be possiblely seen that the lettings ready III and industrial and see that the lettings ready III and industrial and see that the lettings was are for industrial and see that the letting was are for industrial and see that the letting was are for the control was a second of the contr

Another aspect of the Intruder Watch that meabers may have overlooked is the recessity to supply of delegats to 99 MAPIC. Contresions being the property of the property of the property of the regular and pentistent introders heard in our bands over the years. By accrutishing past reports several patterns have emerged which will serve to emnotation the immonitance of observations.

All the Yong Continence of Region 2 Anatomic Red Anatomic Red Anatomic Red Anatomic Red Continued Continue

Note — State Co-ordinators are as follows — VK1AOP, Ted Pearce, 45 Carnegle Crescent, Narrabundah, 2604

VICEAFG, Las Weldon, 11 Raymond Avenue, Northmesd, 2152

VICEAF, Nor Stafford, 16 Byron Street, Box Hill South, 3128.

VICEAF, Warrey McGregor, 6 Murray Street, Rad Hill, 4059.

VISLG, Laith Cotton, 64 Weroons Avenue, Park-

holitis. 5043.
VKS. Albert Cash, 54 Frederick Street, Shoshwater Bay 6103.
VK7MX, Max Ives. P.O. Box 12, Devonport East,

WICEN ACTIVITY

A major WiCEN activity was held last January in Elder Park (just north of he Adelaide "Square Mille") in assisting the Good Neighbour Council with communications at the Australia Day Fair. A total of 21 operators manned VKSWI/P and of 22 operators manned VKSWI/P and of MHz on this occasion.

For the first time in South Australia, WICEN was able to demonstrate the full potential of amateur radio as a message handling media through the handling of





Bowen VK5CXU

the third party traffic. This activity was approved by the Regulatory and Licensing Branch for which we are thankful of their co-operation.

WICEN was able to demonstrate to the public how amateur radio provides excellent communications. A candid photo shows Gordon Bowen VK5CXU relishing a quiet moment at one of the portable locations.

I would like to take this opportunity to personally thank all members who ably assisted in this excellent public relations exercise.

> Alan Raftery, VK5BW, VK5/8 Senior WICEN Co-ordinator

LARA

Ladies Amateur Radio Association

"FORHUNTING"

OR "WHICH TREE DID WE LOSE THE BEAM OH MAR"

LARAS first year has been remarked o for many things but perhaps our best known activity as a group, in VK3 sepecially a toxhanting — or as purists prefer — "vixen-hunting".

Several of LARAs founder members in VK3 are also learn fortuniers, so one of the first gettogether activities supposted was a foxfurnt with a difference for two, As a pressent change from betting around the

countryside at dead of Inght (as in VHF cround the Finder might behaviors) will but ARAB bell record the countryside on Sunday affairsons related when we can at feast see where we're going when it we don't recognise to We have a berbeuce as well with or without her variational charolistic calle, and, most reportant of all each issue of country and country includes a seed one say hound the country of the coun

The first featherst we had was in fact unofficially risked "by good rearning had as they were unable to dec de which of them should be the VI. for the control of the state of



Norma VK3AYL and hounds

of LARA traing the field by about 1/2 hour -- we wonder why.

Since this first bunt there have been several

happy days in the field — occasional by the the field right up to the bases, unfortunally — and sensitive up to the bases, unfortunally — and sensitive radio in the way. Nevertheless are not always the capital and the sensitive that the sensitive the sen

and cocce notify it arous. Sometimes the fixe is a decision in inflating pages but notices are not maken in inflating pages but notices are not many fixed who will say "Dut it a down can where yours if it — art "I'll — I'll as lat on leafy leaf! and it is not the page of the page of the page of explanations with feeting outputs. On the explanations with feeting outputs. On the page of page of the page of are still in Boune Silent you are in the window are still in Boune Silent you are in the window page of the page of the page of pa

month's limetabling, no LARA notes reached AR and at legger readers missed the news that LARA a row one year old — happy birthay, "re ra" and al that, July 20th was selected as the birthday party day in VK3 and appropriate celebrations are planted for this happy occasion.

planned for risk nappy occurrent. To celebrate achievaments by mambers during the year we "risty saute from Robinson whose work as reasurar of the VK3 children of the final-fule has been appreciated by most of the VK3 members in general, as well as those in LARA who wish free continuing success, aspecially in the

with lines continuing success, especially in the August exem.

Secondly to Mayle Russell congratulations on passing telegraphy at the February exams.

At the time of going to press we do not know of other YLs auccessful in exams so fair this year tome heavily even heard results yet; but congratisations to those successful already and best of fluor to a those successful already and best of fluor to a those story.

AFTER THOUGHTS

MODIFICATIONS TO A 2M SOLID STATE TRANSVERTER

Peter Williamson VK4ZWP 3 Rabaul St., Sold ers Hill, Mt. Ses, 4825

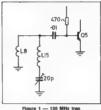
Since the original article was prepared, the availability of specialised test equipment, including a Spectrum Analyser, some minor modifications have been made to the unit, and test floures taken

(1) MODIFICATION
Add a 130 MHz trap to the base of the power amp Stage Q5. The new coll is

designated L15, L15 5T 20 SWG TCW 5/16" I.D. 1 DIA spacing between turns. (2) ALIGNMENT

Tune 20 pf: binner for minimum 130 kHzcutiput — noise most analsum: Fut equipment will not be seralitive, or selective and of the property of the property of the property of the property of the time transverter as per previous instruction, then with single tone expect doubt 20 MHz. Then increase capacity until output power just return to normal. This procedure is not optimum but will be apported to the property of the property of the protedure is not optimum but will be apported to XI FEET (EARIORS). So Sourceau Fraissions.

Test equipment SYSTRON DONNER DC
— 10 GHz Spectrum Analyser HP DC-500



Agent I — 100 mile ita

A STRANGE CIRCUIT

invented by G. Miles VK2KI

offer an explanation.

Occasionally a circuit is constructed that works well but according to theory it shouldn't work at all.

Git, VK2KI, has built such a circuit. Here is the story: perhaps you can

In February 1975 the technical editors received the first of several letters from Gil describing a noise reduction circuit. Gil wrote Because my location is surrounded by home units and I am unable to erect an antenne well up in the clear, I am subject to very severe noise particularly the continuous background type. Over the years blankers and signencers of the IF and MF.

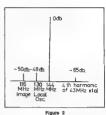
variety have been tried but none so effec-

tree, simple and easy as this circuit.

The circuit consists of only him lems, a
100 pF variable capacitor and a coil of 16
turns of 18 againe enamed on a one inch
diameter former. These components are
wired in series and erclosed in a metal
box. The capacitor is grounded at one end
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(presumably series resonance).

Gil explains that the noise usually runs



...

MHz ATTENUATOR — Single 1 kHz tone input to exciter (Home Brew 14 MHz).

(4) Since writing, the transverter has

been fed into a power amplifier consisting of a QGE03/10 and a QGV06/40 providing S0 W RMS OUT SINGLE TONE for Oscar 6 & 7 work. The circuit used is the same as in the previous TUBE type 2 M transverter published in AR.

Plucotino in a suitable XTAL was all

Plugging in a suitable XIAL was all that was required, re-tuning only providing a 1.5 dB Increase in output. Spurious emissions with the linear were better than the measuring capability of the analyser (7-70 dB).

at a steady S3 to S4 and most signals are arround S4 to S5 in use the creuit, a tuned until the noise level dips. Says Gil "it would seem that such a circuit would indeed "suck out" both signal and noise Not so! Certainly the signal drops but the noise seems to go down faster than the signal and I am quite happy to insten to S2 or S3 signals on headphones if the noise disappears."

Of course in theory a series tuned circuit should attenuate both signal and no.se by equal amounts eventually resulting in a degradation of the signal to noise ratio as the the signals get weaker and thus the recever's internal noise becomes more prominent. So does the circuit work and if so how?

Gli reports that Ray, VK3RS, Des, VK3RD and VK3AM have buit similar circuits and achieved the same results. Alab Bob, VK3ML and Snow, VK3MR, nave been treated to a demonstration by Gli and both agreed that it works effectively. So apparently it works, but why?

Overload by noise, local signuls or some effect refaled to intermedulation or maalignment of the FT200's have been proposed as possible reasons why the circuit works None of the associated explanations are very convincing. Therefore this article has been published to see if any reader can propose a convincing explanation. Over to you.

de VK3AFW

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SIDEDAIN ELECT	HUNIUS SALES
ATLAS models 210-X and 215-X 80 to 10 & 160 to 15 M transceivers inclusive factory installed noise-blankers.	MARK MOBILE ANTENNAS Helical 6' long HW-40 for 40 M. \$18 High power KW-40 for 40 M. \$25 HW-20 for 20 M. \$16
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Model IC-502 6 M SSB portable transceivers 52 to 53 MHz. only \$175	ASAHI MOBILE ANTENNAS AS-2-DW-E ¼ wave 2 M. mobile whip \$8
YES, we feel some newcomer in this game requires a bit of honest competition and there is more to come after we get really organised and our teeth bitten into it deeply!!	AS-WW % wave 2 M. mobile whitp AS-GM gutter clip mount with cable and connectors M.Ring body mount and cap for ¼ M. whips \$5
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YAESU-MUSEN model FT 101-E AC-DC transcelvers 10 to 160 Mw. speech processor 3650	A147-20T combination horizontal-vertical 2M Yagi 10 ef. each \$60 A144-20T same as A147-20T but for combination vert.
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BARLOW-WADLEY mode! XCR-30 MK II portable DC communications receiver \$180	CRYSTAL FILTERS 9 MHz, similar to FT-200 ones, with carrier crystals \$35
H.Y.GAIN ANTENNAS 1A/VQ 10-40 // werticals, 19' tall, no guys 18A/T-WB 10-80 M, werticals, 27' tall, no guys 18A/T-WB 10-80 M, werticals, 27' tall, no guys 1952 M, werticals, 27' tall, no guys 1953 M, werticals, 1953 M, werti	KYOKUTO 2 Mater FM 15 Wett output transcelvers with digital read-out and crystal synthesized PLL circuitry, now with 800 transmit and 1000 received technoles S Kitt apart, overs all of 144 to 148 MHz, receive to 149 MHz, no more crystal sort outputs, simplex, repeater and anti-repeater service. SINI John 15 MHz, and
ANTENNA ROTATORS Model CDR AR-22 junior rotator for small and light beams \$55	output VFO controlled, self contained AC-DC operation \$575 FERRITE CORE BALUNS cheaper Japanese product
Model CDR Ham-II for all hi beams exceet at M. M. COR M. C	for up to 500 W RF COAX CABLE CONNECTORS-SWITCHES Amphenol hypes, female for R68U and R638U cable, two hypes, female chassis mount, double maie, double female, all hypes and T-connectors 19-bettion coax switches 19-bettion
0-200 and 0-2000 Watt scales \$60 DRAKE TV-1000 TVI Low pass Filter \$25 SINGLE METER SWR METER \$12 and \$15 TWIN METER SWR METER \$22	27 MHz TRANSCEIVER\$ 5 Waft AM 6 channels with 27.800 MHz crystals \$75 1 Waft hand-held 3 channels 27.240 crystals \$50 15 Waft PEP 23-channels AM-SSB model SE-501 \$175

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NEWCOMERS NOTEBOOK

Rodney Champness, VK3UG David Down, VK5HP

AN 80 METRE NOVICE RECEIVER --PART 4 - THE AUDIO AMPLIFIER AND POWER SUPPLY

The audio amplifier is probably the easiest section of the receiver to understand as each stage has only one function to perform. The audio amplifiers are linear amplifiers operating in class A.

DC VOLTAGES

The audio amptifler includes all components from C68 to C76, R63 to R77, V6 and T10. The two valve sections of V6 each receive bias due to the voltage drop across their respective cathode resistors "77 and R73. Initially each valve has no negative plas applied to its grid to control Its conduction. As soon as each valve section commences conduction, a voltage drop occurs across each cathode resistor. The voltage at pin 8 and pin 7 will go positive as the plate supply to both valve sections a post ve. Pin 9 and pin 2 are both at DC earth through high value resistors. although for clarity, they can be considered as being wired straight to chassis for the purpose of this explanation. With pins 9 and 2 at earth potential and pins 8 and 7 severa voits positive with respect to earth, it will be seen that pins 9 and 2 are. in fact, negative with respect to pins 8 and 7. If pin 8 is 5 volts positive, this means that pin 9 is at earth potential which is 5 volts in a negative direction from the cathode. The values of R67 and R73 are such that the valve sections stabilise at a particular value of cathode current which corresponds to a suitable blas to obtain linear operation.

AC OPERATION

Having established the DC operating points of the valves, we move on to the AC operation or audio amplification of the two sections. The voltage at the plate of V5 will vary at an audio rate depending on the Input RF signal and the setting of R59. Take it as read that this does in fact occur -last month's Issue should have made this clear. This variation in voltage at the plate anode of V5 which is a combination of DC and superimposed AC is applied to one plate of C68. Under static (no signal) conditions the voltage on the plate of V5 will be between 25 and 130 volts positive (see table), and one plate of C68 is connected to this potential. The other plate is connected to earth via R64 and is, therefore, at zero potential. Suppose V5 plate is at 100 volts positive, then C68 is charged to this same potential. Consider that the influence of the AC component on the plate of V5 is to lower the plate/C68 voltage to 50 volts instantaneously. The capacitor C68 is charged to 100 volts and

it cannot discharge instantly as it must discharge through R64 at 0.47 Megohm resistor. The plate of C68 connected by R65 to the grid of V6A is therefore driven negative with respect to earth to the value of negative 50 volts. The capacitor still has 100 volts dropped across it, but the audio component has been coupled across it from the plate circuit of V5 to the grid circuit of V6A. The audio signal applied to the grid of V6A causes the bias to vary at an audio rate, which from previous discussion you will remember causes an amplified version of the audio signal to be developed in the plate circuit. V6A and V6B are coupled together in the same way as V5 and V6A are coupled and the operation is the same with the exception that the audio signal is increased by about 15 times in voltage

C68, C69, R64 and R65 form an elementary bandpass filter designed to pass the voice communications frequencies of 300 to 3,000 Hz with little attenuation, and to attenuate all other frequencies as much as is possible. The network in the grid circuit of V6B does exactly the same thing. The cathode bypass capacitors in both sections of V8 are relatively low value so that their bypassing effectiveness is minimal below approximately 300 Hz, in this case forming an elementary high pass filter, in other words passing all frequencies above 300 Hz. The values of the capacitors and resistors in these networks are determined by the Impedances of the circults into which they work, the frequencies that are required to be passed and the shape factor of the filter. It is not intended to go into the design criteria of filters in this article, and they may form the basis of some future article.

AUDIO OUTPUT

The output from V6B is coupled via a speaker transformer to a small loudspeaker. By examining the table showing the voltage to be expected at each valve element, it will be seen that only 10 volts is dropped across the speaker transformer However, when the voltage on the grid of V6B is fluctuating at an audio rate, the current drawn in the plate circuit will also endeayour to vary. The speaker transformer T10 has an appreciable amount of inductance and acts like a choke. You will recall from elementary notes that one of the characteristics of chokes is to oppose any change to the value of current flowing through it. Therefore, if the current drawn by the valve is reduced, the choke endeavours to get it to draw more by increasing the voltage to the valve plate. The converse is also true - if the valve endeavours to draw more current, the choke opposes this and the voltage applied to the valve is reduced. The transformer will. therefore, have an apparent resistance or more correctly, an impedance to the flow of AC/audio which is much higher than the measured ohmic resistance of the primary winding. The valve, therefore, has a high impedance AC/audio load but a low resistance DC supply.

The speaker transformer used in this receiver has a 14,000 ohm primary impedance to a 3.5 ohm secondary impedance. Just as a tractor, road grader, etc., needs large reduction gearing between the high speed engine and the road wheels, so does the valve which is a high impedance device need the equivalent of gearing to match the low impedance of the speaker A value of 14,000 ohms for the primary may not be optimum as there are no data sheets to the author's knowledge on the 6BL8 used as an audio amplifier A 10,000 ohm to 3.5 ohm transformer should also be quite satisfactory. The impedance ratio of the transformer used, T10, is obtained by dividing 14,000 by 3.5 which equals 4,000:1 This is the impedance transformation ratio. The turns ratio of this transformer is obtained by petting the square root of 4,000 which equals approximately 63:1. This means that 63 volts applied across the primary will appear as 1 volt across the secondary, but the current will be 63 times as great -- if the transformer were 100 per cent, efficient, which it is not. It is easier to obtain a 7 or 5K ohm speaker transformer with a 3.5 ohm secondary. Speakers with 3.5 ohm Impedance are not always easy to obtain, but 8 ohm speakers are readily available. Now, if an 8 ohm speaker is used on the 3.5 ohm winding, the transformation of its Impedance back into the primary will be 8/3.5 x 7K ohms = 18000 ohms, or 8/3.5 x 5K ohms = 11400 ohms. You can therefore, use a valve type speaker transformer other than 14K/3 5 ohm if you are prepared to do a little calculation of impedance transformation radios.

The output from the speaker transformer is fed to a stereo type phone jack with a set of changeover contacts as per the circuit diagram in May issue. The audio can go direct to the Internal speaker or can be fed to an external speaker, or can feed a pair of headphones wired to the ring and sleeve of a stereo plug. R76 is adjusted in value until the volume is at a satisfactory level for the operator, B77 serves a similar purpose for monitoring the modulator nutnut. This is now redundant as off air monitoring is achieved via the receiver in a desensitised mode.

The receiver is used to monitor the transmitter by keeping almost all of it operating even when the transmitter is operating, only the hexode section of V4 being switched off. With the hexode noperative the sensitivity of the receiver is quiet low and consequently it is not overfoaded by the transmitter on the same chassis. However, it is still necessary to contro Ithe actual level of the monitored signal fed to the speaker and to our ears. R70, R71 and R72 control the evel of the monitored signal applied to the grld of V6B. R71 and R72 have no effect on the signal when on receive, as they are floating above earth. When the transmitter is brought into operation pin 5 of STR2 is earthed via a relay contact within the transmitter section. It is important that the position of R27 be altered to that in the diagram in May issue, otherwise RF will be fed into the grid of V6B and cause distortion. R27 which is only 100 phms



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TR-24

World Clock



YO,100



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SWL station could be complete without one. Stocks expected around late September

Also shown in the photograph is the YO-100 monitorscope FT-101E transceiver, YC-801 digital readout adapter and YP-150 dummy load-power meter

QTR-24 PRICE \$27



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Appl-cation		SSB-	SSB	AM	AM	FM	CW	CW
		Transmit	Receive				RTTY	RTTY
Number of Filter Cry	stals	5	8	8	8	8	4	8
Bandwidth (6dB dow	m)	2 5 kH≥	2.4 kHz	3.75 kHz	5.0 kHz	12 0 kHz	0.5 kHz	0 5 KH2
Passband Ripple		< 1 dB	< 2 dB	< 2 dB	< 2 dB	< 2 dB	< 1 dB	< 0.5 dB
nsert on Loss		< 3 dB	< 35dB	< 35dB	< 35dB	3 0 dB	< 5 dB	< 65dB
Input Output	Zt	500 Ω	500 Ω	500 Ω	500 Ω	1200 Ω	500 Ω	500 Ω
Termination (Ct	30 pF	30 p¢					
Shape Factor		(6 50 dB) 1 7	(6-60 dB) 1.8	(6 60 dB) 1 8	(6 60 dB) 1.8	(6 60 dB) 1 8	(6 40 dB - 2 5	16 60 dB 2 2
			(6 80 dB) 2 2	(6 80 dB) 2 2	(6 80 dB) 2 2	(6 80dB) 2 3	(6 60 dB) 4 4	(6 80 d8 4 0
L timate Attenuation	,	· 45 dB	- 100 dB	- 100 dB	· 100 dB	90 dB	90 dB	- 90 dB
Price		\$31.95	\$45.45	\$48.95	\$48.95	\$48.95	\$34.25	\$63 95

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places the relay contact and the line to the grid of V6B that many ohms above RF earth. It must be remembered that some of the relay contacts have quite a high level of RF on them and that they are close to this monitor audio line. It is also important that the line to RT2 be shielded to overcome any additional chance of RF natiting into the crid of V6B.

SHMMARY

The transmitter and receiver work well both independently and together. The transmitter puts out about 8 watts on AM and 10 watts on CW, it features press to talk for AM operation and semi-breakin operation on CW It has full monitoring facilities for the transmitted signal, the monitor being an off air type - the best type. It is possible to monitor the AM signal to check quality. bandwidth and for spurious signals within shout 100 kHz. The CW signal is monitored for key clicks, bandwidth and used as a keying monitor. The receiver is sensitive. stable, reasonably selective, does not drift excessively, is able to handle both weak and strong signals without stress, and is easy to operate. All in all, the unit works well and should for you too.

In some circumstances C65 may need to be varied in size, perhaps down to 0.027uF, to get good regeneration. It has been observed that some 6BX6 valves are microphonic, so try several obtained from eld TV sets or new ones and use the best one.

PRECAUTIONS

As has been stressed before, the layout of components is extremely important. This transceiver is no more tolerant of gross layout errors than any other piece of electron c equipment. If you are inexperienced at construction practices, it is suggested that you make the receiver (if built separately to the transmitter), on a chassis about 20cm by 28cm to allow ample room in which to work. Spread the work out, keeping each section of the receiver to itself and on no account intermingle succeeding sections unless you know exactly what you are doing. Keep earth leads short - earthing is every bit as important on 80 metres as It is on VHF. Keep inputs away from outputs or you could easily have trouble with oscillation, erratic operation, poor sensitivity, distortion, etc.

It is most strongly advised that you read March and April 1974 Newcomers Notebook for information on equipment layout — it could save you much heartache and trustration with this project or any other project that you may care to undortake.

If possible, obtain all parts before you start building so that you can physically ay them out to see how everything will fit. It is not much good allowing an area 5 cm you require an srea? To square to accommodate it. It is equally important that this component be placed in its correct possition and not wired in later from a spot remote and not wired in later from a spot remote and not wired in later from a spot remote an integral part. Good luck and good operating.

RECEIVER ELECTRODE VOLTAGE TABLE - Measured to earth - Chassis

Valve Type	12AH8	6BX6	6BL8-T	6BL8-P
Cathode	3.5-30v*	Ov	5v	3v
Grid	Ov	Ov	Ov	Ov
Screen	90-120v*	0-50vt	_	200v
Plate	210-250v*	25-130vt	_	240v
Triode Plate	100v		90y	_

*Varies with setting of RF gain, †Varies with setting of regeneration control.

CONTR

Most noucomers will probably have access to old valve bype radios and IV sets and the availability of items from these sources design of this transcelver. The stripping down of a couple of old sets would, in most cases, provide the more expensive most cases, provide the more expensive contraints (private speaker, p. 2. and p

used with a prototype transceiver. The operation of a power supply will not be described here as this is covered quite adequately in the various amateur handbooks available from our advertisers or from Magoubs. The output voltage of the power supply varies with the amount of current drawn from it, which explains why the voltage to the receiver is 360 volts but only about 310 volts on AM transmit, it is important that C1 is earthed to the same appt as the centre tap of the high tension winding, otherwise earth loops can be created throughout the chassis, which could cause unnecessary hum in the raceluar

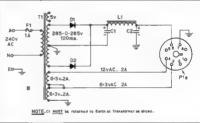


Figure 1 — Power supply for novice transceiver

On this basis, and depending on one's willingness to "make the most of things", it is estimated that the complete rig could be built for between \$20 and \$60 which is a fraction of the cost of even the cheapest commercially available transceiver modified for novice use.

The receiver covers the whole of the 80 metre amateur band (not just the novice segment) on CW/AM/SSB, and subject to crystal availability, the transmitter will

cover the same range on CW and AM.
The unit, therefore, has a much wider application than its name might suggest. Being moderate in both size and weight, it could be a useful "second string" for portable operation even after obtaining a full call

POWER SUPPLIES

A number of people have asked about a power supply for the Novice Transcelver. The supply shown in figure 1 is the one It might be pointed out that this is only one of many variations of power supplies that can be used to power the transcelver. Voltage doubler type power supplies, bridge rectifier systems and so on can be used equally as well as the unit described.

Some newcomers have asked how they could operate the heater system off 6.3 volts AC. This is simple, wire all valves



Figure 2

with one and of their heaters to earth and the other end to a 6.3 we line run around the chassis to each uncarthed heater run around the chassis to each uncarthed heater with the 12AHO II used. This makey supply sail the 12AHO II used. The makey supply and the 12AHO II used. The makey supply sail the 12AHO II used. The 12AHO II used to 12

POWER SUPPLY COMPONENT LIST F1 = 1 amp fuse with fuseholder.

T1 = Old valve type power transformer.
240 volt primary, 265-225 volt
centre tapped secondary at 100ma,
5 volt 2 amp winding (unused), 2-6.3
volt 2 amp winding wired in series
aticing to give 126 volts at 2 amps.
D1 = EM410 siltoon power diode. 1000
volt 1 amp dlode, Must have a peak
inverse voltage rating of at legat.

3 x 285 volts = 855 volts, Rating of diode is therefore adequate.

D2 - EM410. As for D1.

- C1 16uF 450 volt working electrolytic capacitor.
- C2 = 16uF 450 volt working electrolytic capacitor.
- L1 = 3 to 10 henry 100 ma choke. Old TV type choke ideal, as they have low winding resistance. If the inductance is lower than 3 henries, the capacitors C1 and C2 can be in-

creased in value, up to about 50uF.
P1a = Octal socket wired so that transceiver can plug into the power supply.
R1 & R2 = 2 100k ohm 1 watt resistors

wired in series across C2. They are not shown on the circuit diagram. These are used as bleeders to discharge the power supply capacitors when no load is applied to the power supply. The capacitors usually retain most of their charge for several minutes after the supply is switched off and, therefore, the supply is dangerous to handle. With bleeders fitted the capacitors discharge within 15 to 60 seconds.

Miscellaneous hardware, chassis, wire AC plus, grommets, etc.

ACKNOWLEDGEMENT

The assistance of Dick Goelln, VKSMY2 in the compilation of this series of articles on the Novice Transcelver, has been of great mitter and receiver as separate entitles and not an the form of a transcelver as the subtree of the the subt

COMMERCIAL KINKS

Ron Fisher, VK3OM 3 Fairview Ave., Glen Wayerley, 3188

This month it's back to the FT101 with a couple of interesting faults that have been sorted out by Roy Hartkoof VK3AOH.

A nasty little fault concerns the shifting of the transmit requency when the clarifler control is moved. The normal templation to control is moved. The normal templation control is moved. The normal templation control circuit. However before doing this, try shorting the ends of the clarifler control circuit. However before doing this, try shorting the ends of the clarifler is chartened to the clarifler is created the frequency will still shift, if this happens it will be because the varicage folded bit in the VFO Osc is generating a voltage by rectification, between the state voltage from the clarifler is the state voltage from the clarifler is the state voltage from the clarifler is the state voltage from the clarifler.

The cure is either to raise the static voltage or lower the RF applied to the varicap, or both,

The information in two different FTIOI handbooks is wilely conflicting, and I suggest that since the clariffer is the foregot part of the property of the prop

The next one is not really a fault but an odd effect caused by a popular modification to the FT101. 'One way of stopping the fan from run-

ning on receive with AC operation (heaters

off) is to use the second pair of contacts (S5b) on the heater switch and permanently short the connection from the emitter of the side tone oscillator to the mode switch. This has the bonus that one can practice CW using the sidetone with the heaters off: but if one uses the transceiver on 12 volt DC operation and sets the mode switch to the CW position with the heater switch off there will be a continuous side tone. This is because the only thing that prevents the sidetone oscillator from working is the negative bias applied from the regulator past the key through pin 10 of the AF board to the base of the sidetone oscillator. On DC receive only, the transistor power supply of the 101 is not operating and so no negative bias is developed. It is of course up to the individual whether or not the original modification is worth while or not, but don't tear the set apart looking for a 'fault' when this occurs.' COMMERCIAL INTEREST

Readers of this column may have noticed a small advertisement in 'AR' recently announcing the new G3LLL RF clipper designed for the FT200. Fric Colver VK2BEL who is the local agent for the G3LLL clippers was kind enough to send me a copy of the installation instructions for the new unit. The actual work is a little more involved than connecting the unit to the FT 101 (see AR January 76) but not beyond the average amateur with a soare afternoon, included in the installation notes is a concise method of setting up the AGC system of the 200. It is hoped that a unit might be made available for review in the near future.

BOOK REVIEW

THE RADIO AMATEURS' HANDSOOK, SING EDITION — 1978 — PUBLISHED BY THE ARRL Over 4½ million copies have been seld slace fire published in 1925. This latest edition has several

Over 4% million copies have been sold sector first published in 1925. This lastest edition has devertine leatures, keeping up with the state of the art. Some chapters have been rewritten and among these are those relating to wave propogation, SSE transmitter leating and station assembly. There are also many amendments to other areas and

several new constructional projects.

Some of these are, the inclusion of a general purpose 9-12 volt variable power supply with a continuous tead of 2 amps, and incorporating current limiting.

A solid state digital readout smaller band re-

ceiver covering 1.8 to 28 MHz in 500 kHz steps is given much attention. Mew VHF and UHF receiving techniques have also been netuded. New feature on an audio oscillator with selectable frequency range, filers

also been included. New features on an audio oscillator with selectable frequency range, filters for TV harmonics, a two tone audio generator for SSB testing and a 7 MHz min beam, appear for the first time.

The ARRI. Mandbook continues to propress, and

ceters for beginners and experienced amateurs affile. — VKSUV

Trade Review

The combination of THETAGRID and special transfers is a system for producing 1 off PCB's without the mess that etch resistant paints and inks can cause. Also, if, like me, your hand tends to wobble when drawing lines, then Thetagrid is the way out.

The THETA company have taken PCB laminate and covered it with a grid of 0.1 x 0.1 square inches. On to this one can stick etch resist transfers of full size foll patterns for ICs and translators etc.

The required foil pattern is laid out directly on the board to be etched using the Thetagrid grid lines for alignment. The transfers are pressed firmly onto the board and amoothed to remove any slight winkles or bubbles that may occur by rubbing over the carrier sheet with a pencil. Although not supplied in the sample received, tapes for straight and conductor runs are supermitly existing the conductor runs are supermitly existing.

It is possible to use some brands of the layup tape designed for making PCB photographic masters as a resist for direct etching, however the etch fluid tends to attack some of the adhesives and this can lead to etching away of the board tracks.

Page 30 Amateur Radio August 1976

The grid pattern is removed from the board by the etching solution. It does not affect soldering The results of tests were quite satisfac-

*Further data obtainable from THETA,

P.O. Box 10, MARTOCK, SOMERSET TA 12 6 LT ENGLAND.

VK3AFW =

MAGAZINE IN DEX

Svd Clark, VK3ASC

One KW - Solid State Style, Part 1, Learning the Work with Integrated Circuits: An ITV Cure for 8 Metres, Propaget on - Past and Prospects, 360 deg. Bleerab e Vertical Phased Arrays; How to Use Zener Diodes CW Super Selectivity: The Gustems sn Eringuskes — February 1976; How Much Coss Gasovine Cost in Brazil. RADIO COMMUNICATION June 1978

Audio Operated Squeich, Learning About Logic; Datong Frequency Agile Audio Fifter RHORTWAYE MAGAZINE March 1978

marine VHF for Yachts, HF Band Converter. April 1978 About Slow-Scan Television Switching Applications of the Transistor, About HMS Marcure - The Royal Nevel Amateur Radio Society, Min-Rhombio Layout Leoher Line System, S-Meter for the R1475.

VIIII-UIII AN EXPANDING WORLD

Eric Jamieson, VKSLP

Farreston, \$223 AMOUNTAIN GLOSS SECTIONS VICE VKOMA, Mawson 83,100 YKOGR, Casey 63,290 VIC VKIRTA, Canberra 144.479 VICE VKZWI, Sydney 82.458 VK2WI, Sydney YK5 VK3RTQ, Vermont 144,700 VK4 YKARTL, Townsville VKARTT, Mr. Mowbullen \$2.580 144.400 YKSVF, Mt. Lofty YKSVF, Mt. Lofty OKE 53 000 144,800 VKB YKERTY, Parth 52,300 YKERTU, Kalgooriie YKERTW, Albany 52,350 52.050 VK6RTW, Albany 144,580 YKORTY, Perth 545 BBD V107 YK7RMT, Launcesten 52,400 VKTRTX, Devenport 144,000 YK7RTW, Loneh 432,473 VKSVF, Darwin DE REI SDSAA, Buve, Fill 82,500 JD1YAA, Japan ZL1VHF, Auckland 80.110 ZL1 146 100 ZL2MHF, Upper Helt ZL2VHP, Pairperaton North ZL2VHF, Wellington ZL2VHP, Pairmeraton Morth 28,170 82 500 185 200 145,250 ZL2VHG, Palmeraton North 431,860 71 9 ZL3VHF, Christchurch ZL4VHF, Qunedin

On the beacon question, the boys in Tasmania will be pleased to know I have received a letter from John, VK4VK, in Sorrento, Queensland, indi-cating he heard VK7RNT, the new Launceston beacon on \$2,400 on \$7,675 at 0530Z at 35 for about 30 minutes. No VK7 operators were heard however And so mid-winter DX pops up occasionally I note also that John works 144 MHz SSB from time to time, so that's another we can add to the potential VK4 list of 2 metre SSB operators.

A letter comes from Winston VK7EM advising of the operation of a newly installed beacon with the call sign VK7RTW on 432.475 MHz from 31/5/76 Power output is approximately 20 watts Into bi-directional enterna orientated roughly NW to SE with 800 Hz FSK Ident. The beacon is operated by the North Western Branch of VK7 and Winston is examonable for its operation. So that is really good news and should be of interest to many

George VK4GS has written an Interesting lette with news of happenings in the Northern part of Queensland up to 16/6. He reports not many 6 metre openings to JA this year ao far, and a few winter DX contacts to southern VK States. VK4RO in Ayr, Joe VK4JH, Bob VK4RQ and Bill VK4ABG all in Townsville, Mario VK4MS in Ingham, and Graham P29DJ near Pl. Moresby are the present 6 metre stalwarts at present, with himself on occasionally. George also mentions that apart from himself, all the above plus several more in Townsville and Cairns have 144 MHz capability and keep an ear open for signals. Looks like my bit of talking when I visited Northern VK4 last was convinced some of you guys of the potential of 144 MHz, and it is pleasing to know so many are willing to try. Long distance contacts, and I mean really long distance will not come easily, but when conditions are right there will be the usual 400, 500 mile paths, with Ea conditions giving 1000 miles and more. It is a matter of being patient and keeping the gear in good order by regularly using II for 100 to 200 mile contacts.

George also mentions VK4RO, VK4JH and VK4MS have 432 MHz 858 equipment and are all in the process of constructing helical antennae. appears also that P260J is interested in the same band. Again this information will be noted with interest by those stations south of you, and we may yet see the day when contacts are possible een VK4 and other areas of VK. The fect that ameteurs are prepared to have gear on bands which may only provide the occasional contact is something truly in the greatest of hem spirit, and I commend you all. In addition to the above, George VK4GS sends

a latter he received from Hatsuo JA1VOK in Japan, and the interesting parts to our readers is condensed herewith. Local QRM is very bad in Japan during the peak periods of Es openings. AG&JDX worked several times in April. YS&BE in Hong Kong worked 6500Z on 9/5 and on 11/5 worked 4 different times. The only bescon in Japan is the one we have listed, JDIYAA.

Japanese operators on 8 metres work CW be been 50.050 and 50.100. SSS 50.100 to 50.250. AM 50.250 to 50.800, FM 50.850 to 52000. On 2 metres, they operate CW 144,076 to 144,100, SSB 144,100 to 144,300, and FM 144,320 to 146,000. Hatsup operates between 144,050 and 144,300

with CW or SSS using an 8 element vaoi 19m high with a 500 watt transmitter. He proposes upgrading his antenna performance. Present polarisation is horizontal. He is very anxious to contect VK stations on 144 MHz and looks particularly to VK6 and VKS operators, and now probably VK4 with the increased 2 metre capability in the northern area. Propagation lests are apparently being carried out ground 102 MHz and indicate March and September to be the best months. If any aspiring 144 MHz stations with suitable aniennee and power capabilities would like to the for such TFP contacts why not write to JATVDK, Hatsup Yoshida, 1453-5 Kenesugi, Funebeshi - City, Chiba 273, Japan, the results might be worthwhile.

From the pages of "Forward Blax" of the A.C.T. Division comes news that Bill VK18H is now opera-Bonal on 432 MHz using a 12 element beam. Also it was goted that the editor VK12ME recently managed to iransmil a TV test pattern at good strength across he length of his shack on 425 Good work Martin, but try opening the door next time and you could go a lot further

Another nets mentions the return to the bands of Tony VKIVE who is now operational on 2 metres using a multi-mode transcelver and has been worked on the FM channels so far. For those of you who don't know, Tony was injured in an explosion which cost him his aversight and the use of both his arms. His HF operation in the past was done mainly using VOX and a footswitch. Tony operates the controls of his equipment with his toes. And the persgraph concludes . . "Wel-come to VHF Tony, you will find a triendly group of amsteurs hero". And I might add it is great to hear how someone like Tony can overcome such serious disabilities, and it speaks much for that true ameteur spirit, and I am sure we all commend his fortifude. E.M.E. REPORT

As usual, from the pages of "The Propogator" some news to keep you informed on EMF. opera-tion of VK2AMW at Dapto 1 reads

Water leakage into a coaxial fitting of the transmitter RF output cable prevented operation during the U.S.A. window period of the monthly EME tests on 8/5. Signals were heard from JA1VDV while the cable was being dried out, but none from our scheduled stations r USA "The European window test period ater in the

evening also resulted in no scheduled stations being heard although our echoes were up to 11 dB over no se "A specia EME test was arranged by the

Stanford Research Institute (WASLFT) Group for 23/5/76. Moonrise at VK2AMW during this test was 0218 EST on 24/8 Charle VK2ZEN made at the necessary preparations over several days prior to the test and had the equipment operating some minutes prior to moonlise. Signs a were not based until the moon came up but it was subsequently found that the high power test scheduled for this time had not taken place. "Signals were peaking to 20 dB over no se and

averaged 15-18 dB. WASLET was heard in contact WSCCX WB7BST, VKSATN, JA9BOH and W9WCD during the test period. Some time was required to calibrate our system against the WASLET signal level in preparation for the anticipated high power tests starting at 1800Z (0400EST) but they did not take place. However, WASLET carried out the scheduled reduced power test shortly efter this time and their signs a were copied down to their lowest level even though they were using 3.8 Miz IF passband at the time. Another calibration run was then carried out on our receiving system "No attempt was made to tranamit to WASLET

or any other station as they had Indicated that this test was simed at them working stations they had not worked before plus obtaining information from their special high power tests. Charles time was fully faxen up with calibration checks alo. Club member Ken Grimm he ped out by operating the chart recorder, entering information on the chart record, etc. Bruce Proctor also assisted again during this test, which was in the west small hours of the morning. Bruce has become an excellent second operator at Depto and is quite an expert at dish pointing, information logging assisting with signal checks etc. Keith VK2ZYI issued a good quality stereo taps recorder for this special test to facilitate correct on of commente with elenals on the tape" am sorry to note step that Lyle VK2ALL, the

ploneer of Dapto E.M.E. operator, is still not able to get about for such tests due to a back intury, but I guess he still ands a hand with moral support and advice Also of internet is the fact that the operators at

VK26MW can beer their own achoes up to 10 dB with stations in U.S.A., Canada, England France Staly and Japan and stations heard in Holland and Rhodesia. VK2AMW and G3_TF in England have successfully exchanged aignals over the longest point to point distance currently obtained on 70 cm amateur band, being 16955 km or 10535 miles. Good work chaps These notes have been prepared in a motel room at Lockhart N.S.W whilst on a holdsy run

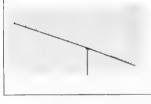
to visit Lyle VK2ALU and to have a look at the VICCAMW E M.E. Installation. Included on the agends are a visit to Ray VKSATN and Ron VKSAKC, who also have E M E equipment So in an effort not to disappoint at my good readers. the necessary information had to be brought with me in the car and prepared in this room. So if anyone wrote to me towards the end of June II a Whele your news would not be nouded as I left before the and of June 1! it is at it current news. will be included next month

So at this point there isn't much off to report except to say I noticed a little par in the VK7 QRM which reads. 'Definition' Of a half wave A greeting to someone you don't really, I ko.' So on the strength of that I will conclude with the thought for the month which I also brought with "People with an axe to grind often fly of

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Len Poynter, VK3ZGP

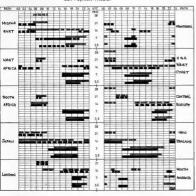


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20 YEARS AGO

Ron Fisher, VK3OM

Looking through the August 1956 issue of Amateur Radio, I noticed William Willis advertising the Gorier Coll Turrets. I wonder if a few are atilit tucked under the bench waiting to go into that receiver to end all receivers. They were quite a massive device, and as far as I can remember one of the very few turrets for all band coverage ever released as a separate unit. Those all band Aussian translator radios available today on the local market are about the nearest approach to the Gorier turrets that I have seen

The Broadcasting Control Board recommendations for TV receiver IF frequencies were pubchoice. The three ranges considered were 20 to 30, 30 to 40 and 40 to 50 MHz, with the final recommendation being of course 30 to 40 MHz.

Technical articles for August included Don Haberocht's massive 20-15-10-5 and 2 metre beam. The 20 to 5 metre section was a WSJK with a 24 element phased array on top for 2 metres. If you hannes to be one of the vounger fellows. The WBJK is two element beam with both elements fed in phase. As in this case, they could be fed with tuned feeders to echieve multi band operation. The WBJK was originally developed about 1837 John Krause C. W. Mann VKSDF described his phone and CW monitor, and J. G. Oliver VK7JO showed how to set up an index system while Jim Lloyd VK3AST provided a few hints and kinks.

Australia and the International Geophysical Year Professor H. C. Webster explained the alms behind the event and how smateurs could help with ryations of propogation especially in the 50 to 60 MHz region.

OSP

STATISTICS AGAIN FCC in the USA received 11458 amateur applica

Bons during February of this year and at the end of that month 263,896 amalour operator's licences were extant. Novice licences were 24,154, Technical 51,654, Conditional 25,633, General 80,313. Advanced 67 636 and Fetra 14 496 June '76 OST

IARU NEWS

Encouraging signs are appearing of the formation of an amateur society in Papua New Guines. Such a society certainly would be invaluable to the IARU quite apart from any other services it might

be enabled to perform on behalf of the members. PNG is a member of the ITU and therefore possesses one vote at ITU Conferences - especially WARC 79. Readors will be aware of the tremendous efforts being made to establish a favourable attitude to amateur radio in administrations of ITU member countries where emelours are few or non-existent. This has particular reference to the "Third World" countries where each possesses that one vital vote.

In Region 3 there are 27 countries that are ers of the ITU each with one vote; as always 8 of those countries have smateur radio societies affiliated with the IARU R3 Association. Amateur radio is a banned activity in up to 5 or 6 of the other countries.

Hugh Cassidy, WASAUD writing in his DX column in CQ April '76 about possible China (BY) activity records that some of the VS6 amateurs feel that the possibilities of some (smateur radio) activity has improved in recent years but that activity the country (rather than visitors from outside) and operating a station at a technical school or a radio club station.

Reverting again to this Important ITU one country one vote rule, it is interesting to observe the representation of the small Region 3 ITU member countries compared with the larger countries.

The five largest area or population countries (China, Japan, India, Indonesia and Australia) cover nearly 23 million square kms with a total

population exceeding 1,500,000,000.
Fiji covers 18,000 eq. km, population 535,000. Neuru covers 2 eq. km, pop. 8700, Tonges 700 sq. km, pop. 77,000. One would be forgiven for believing that perhaps

one day other criteria could soply.

HAMADS

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FOR BALE

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chaser to dismantle off windmill tower, VK3BW, Portarlington. Ph. (052) 59 2322 Kee KP202 Transcelver with niceds and charger, Cha. 1, 2, 3, 4, 40, 50, \$150. David Farquharson VK1ZDF, P.O. Box E338. Canberra, ACT, Ph. (062)

63 3166 Bus. FR100B Receiver, FLDX400 Transmitter, Intercon-

PRIODI Receiver, PLDX400 Transmitter, infercon-menting wiring harness, YD644 mitorophone, beat offer will take, Eddystone EC10 general coverage Rx all translator, \$140. FT75B Transceiver, FP75B power supply, FV950 FP0, 2 spars 128PG7 tubes for linel, \$320. VK4LK, V. Kerr, Box 237 Charleville, QId., 4470

Barlow-Wadley XCR-30, mark 2, as new, all accessories, \$170, also AR7 including 10 metre coll box and circuits, \$25. W. R. Gronow, VK3W3, Ph. (03) 56 7231 destime Frequency Meter 200 MHz, \$150. Petrol driven generator, 12 volt, 30 amp with battery start, ideal for field days, \$90. VK3AFQ, QTHR. Ph. (03) 96 2414.

HAMADS-(cont.)-For Sale

52-144 MHz Transverter, see page 5 of March '76 AR, \$50, includes PCB, crystal, diseast box fuses, pagel meter, BNC con, and IGL receive conv. unit working OK. N. Copper VK4ZNC. 5 Cahill St. Strathpine, Old., 4500. Ph. (07) 205 2121

Teletype Model 15 with keyboard, \$70. Marconi Mk. 4 IO. Television camera with lenses etc., complete and working \$200 o.n.o. VK2ZPM, QTHR. Ph.

(02) 476 2304 6 m Selcom Liner SSS-AM, \$210; 2 m Belcom liner SSB, CW, 144-146 MHz, \$240; both as new, all access. 4 6KD6 valves, new \$5 each; 2 68838 (12V 6146B) valves, new \$4 each; National NCX3 80-40-20 transceiver complete, V.G. order \$130; 2 BLY90 new \$15 each: 2 BLYRSA new \$10 each: 6/40 Sockels new \$2 each; TH6DXX entenns with belum, V.G. order \$10; STC 2 m 50W FM transistorised

PA, brand new \$50. Buyers pay freight. VK7NR, QTHR. Ph. (003) 27 2928. No. 62 Bet Transceiver, 1.6-10 MHz; TR1936 Transcoiver, 110-150 MHz; both with circuit diagrams, Ideal wrecking or restoration, any offers? P Hamilton, 10 Highmoor Ave., Bayswater, Vic., 3153.

Ph. (03) 729 2504. Multi 7 2 Mx FM Transceiver with repeaters and enti repeaters 2, 4, 6, 8 (new plan), Simplex 40, 43 (R3 input), 50, 51, 65, mobile mount mic. cable, exc. cond., \$185. Microphone compressor - Katsumi MC225, compression level meter, HI/Lo Imp Input, 2 tone oscillator, runs on 9V transistor radio battery, fair cond., work well, \$20. Linear Amplifier, 2 x 513, covers 80, 40, 20, 15 Mx with provision for extra band, hefty PSU (v/heavy), RF unit compact table top type, 2 spare tubes, works very well, needs tidying up, buyer to collect, \$175 p.n.o. B. Bathols VK3UV, OTHR. Ph. (03) 90 6424

(evenings only) Ken KP202 hand held chs. 40, 50, repeaters 1, 2, 3, 4 (now called 2, 4, 6, 8) nicad betteries, A and R charger fitted with meter and LED, helical and whip antennas, orig. handbook and pkg., 8 watt \$160 the lot. Cacilloscope Heathkit 012U & Inch. & MHZ AC input only, with handbook and probe, \$80. Ted VKSXT, OTHR. Ph. (03) 560 5051.

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Mr. C. J. WILKINS Mr. E. G. CLARE Mr. NORM TYAS VK2ALR VK9ALL VKATY Mr. BILL FARED Mr. MAXWELL JOHN SWABY VK4D4 Max obtained his Amateur Licence in Victoris at the age of 18 years and was active on the Ham Bands right up to his untimely death on 28th June this year, at his home

During World War Two Max rose to the rank of Squadron Leader, RAAF, and soon after his discharge moved to Dalby where he ultimately became the largest Radio and Electrical business in the town; but eventually sold out to take over a large grain-growing property on the Condamine

near Dalby, at the age of 87.

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OBITUARY -- JOHN BATTRICK VK3OR

It is not in how when it can in write stond, about John Smoth. — In die in many linke, it is an interference of the Charles and Charles an

In most of these activities he was working with his friend Peter Williams and always encouraged by his wife Guym. These were only some of the institute activities with which he was concerned. A These were only cortical Disposed Security. Rederal Occur Co-criticator and falon Wices Co-ordinator.— the latter was an activity in which he was always letter ays tried to find time to become involved.

singsy tried to find lines to become browless.

And a transconsens cubination and determination to get the job does characterised corpyring and a first processor cubination and determination to get the processor controlled to the long term sen the vision that he shared nile Point Williams of the used in Figure 200 and the property sent. But since the shared in the Point Williams of the used in the long term sent the processor of the long term sent to the long termination of the depoint long termination of the lon

John passed away on 21st May 1976, aged 47 years. VICUKI

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